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H. O. No. 152

MEDITERRANEAN PILOT
VOL. II



1917

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**FROM THE
UNITED STATES GOVERNMENT**

H. O. No. 152

MEDITERRANEAN PILOT

VOLUME II

THE COAST OF FRANCE AND ITALY FROM CAPE
CERBÈRE TO CAPE SPARTIVENTO, TOGETHER
WITH THE TUSCAN ARCHIPELAGO, ISLANDS OF
CORSICA, SARDINIA, SICILY, AND THE
MALTESE ISLANDS

1917

PUBLISHED BY THE HYDROGRAPHIC OFFICE
UNDER THE AUTHORITY OF THE
SECRETARY OF THE NAVY



WASHINGTON
GOVERNMENT PRINTING OFFICE
1917

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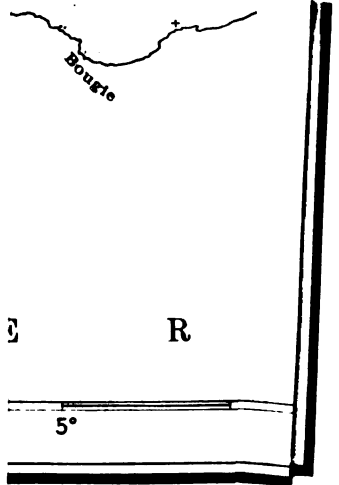
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PREFACE.

This publication comprises the south coast of France and the west coast of Italy, from Cape Cerbère to Cape Spartivento, including Messina Strait, the islands of Sardinia, Corsica, the Tuscan Archipelago, the islands of Sicily, Lipari or Æolian Islands, the Maltese Islands, and the Ægæan Isles. This information contained herein has been compiled from all available sources, but principally from British Admiralty publications, Mediterranean Pilots, Volumes I and II, and is corrected up to and including H. O. Notice to Mariners, No. 53, 1916.

The bearings and courses are true and are given in degrees, from 0° (north) to 360° (clockwise).

Bearings limiting sectors of lights are toward the light.

The directions of winds refer to the points from which they blow; of currents, the points toward which they set. These directions are true.

Variations, with the annual rate of change, may be obtained from H. O. Chart No. 2406, Variation of the Compass.

Distances are expressed in nautical miles, the mile being approximately 2,000 yards.

Soundings are referred to low water ordinary springs.

Heights are referred to high water ordinary springs.

The latest information regarding lights, their characteristics, sectors, fog signals, and submarine bells should always be sought in the light lists.

Attention is invited to the coupons on the first page of this book, which entitle the purchaser to a summary of the Notices to Mariners affecting this publication. They will be ready for distribution as soon as practicable after the first of each year beginning January, 1918.

Mariners are requested to notify the United States Hydrographic Office, directly or through one of its branch offices, of any new information obtained, or of any errors or omissions discovered in this publication.

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GLOSSARIES OF WORDS OCCURRING IN THE CHARTS AND IN THE SAILING DIRECTIONS.

FRENCH.

French.	English.	French.	English.
Aiguille.....	Needle.	Falaise.....	Cliff.
Aimanté.....	Magnetic.	Fanal.....	Harbor lighthouse.
Anse.....	Bay, creek.	Feu.....	Light.
Atterrissage.....	Making the land.	Feu permanent.....	A light constantly burning and unwatched.
Avant port.....	Outer port.	Fin, e.....	Fine.
Azur.....	Blue.	Fleche.....	Spire.
Babord.....	Port.	Fleuve.....	River, stream.
Baie.....	Bay, gulf.	Flot.....	Flood.
Balisage.....	Beaconage.	Foc.....	Jib (sail).
Balise.....	Beacon.	Fond.....	Bottom.
Banc.....	Bank, sand bank.	Forme de radoub.....	Dry dock.
Barre.....	Bar.	Fosse.....	Ditch, a deep.
Basse.....	Shoal.	Gare.....	Station.
Basse mer.....	Low water.	Golfe.....	Gulf.
Bassin.....	Basin, dock.	Goulet.....	Narrow entrance.
Bassin à flot.....	Wet basin or dock.	Grand, e.....	Great.
Bassin d'échouage.....	Tidal basin where vessels ground.	Gravier.....	Gravel.
Bateau de sauvetage.....	Lifeboat.	Gril de carenage.....	Gridiron.
Blanc, he.....	White.	Gros.....	Coarse.
Bleu, e.....	Blue.	Haut-fond.....	A shoal.
Bouche.....	Mouth of a river.	Haute mer.....	High water.
Bouée.....	Buoy.	Houle.....	Swell.
Bouée à cloche.....	Bellbuoy.	Île.....	Island, isle.
Bouée à sifflet.....	Whistlebuoy.	Îlot.....	Islet.
Bouée lumineuse.....	Lightbuoy.	Jaune.....	Yellow.
Boussole.....	Compass.	Jusant.....	Ebb.
Brouillard.....	Fog, mist.	Lac.....	Lake.
Brume.....	Fog.	Madrague.....	Tunny net.
Caboteur.....	Coaster.	Marais.....	Swamp, marsh.
Cale de radoub.....	Patent slip.	Marée.....	Tide.
Cap.....	Cape, headland.	Marée descendante.....	Falling tide.
Chapelle.....	Chapel.	Marée montante.....	Rising tide.
Charbon.....	Coal.	Mât.....	Mast.
Chasse.....	A rapid discharge of water from a reservoir in order to clear out a channel.	Menhir.....	A large raised stone, the erection of which may be traced to antiquity. (From the Celtic, maen, stone; hir, high.)
Château.....	Castle.	Môle.....	Mole, pier.
Chaussée.....	Bank, causeway.	Molle.....	Soft.
Chemin de fer.....	Railway.	Mont.....	Mountain.
Cheminée.....	Chimney.	Mortes eaux.....	Neap tides.
Chenal.....	Channel.	Mouillage.....	Anchorage.
Clocher.....	Steeple.	Moulin.....	Mill.
Colline.....	Hill.	Mur.....	Wall.
Compas.....	Compass.	Musoir.....	Mole or pierhead.
Coquilles.....	Shells.	Niveau.....	Level.
Côte.....	Coast.	Nœud.....	Knot.
Courant.....	Current, stream; a name given to streams flowing into the sea between Arcachon and Cap Breton.	Noir, e.....	Black.
Courant de flot.....	Flood tidal stream.	Occidental, e.....	Western.
Courant de jusant.....	Ebb tidal stream.	Onde.....	Wave.
Crique.....	Creek.	Oriental, e.....	Eastern.
Crue.....	Freshet or flood.	Passe.....	Channel.
Declinaison magnétique.....	Magnetic declination or variation.	Patente de santé.....	Bill of health.
Douane.....	Customhouse.	Pertuis.....	Opening or strait.
Échelle.....	Scale.	Petit, e.....	Small.
Échelle de marée.....	Tide gauge.	Phare.....	Lighthouse.
Écluse.....	Lock of a canal or basin.	Pic.....	Peak.
Écuell.....	Rock, breaker.	Pierre.....	Stone.
Église.....	Church.	Pignon.....	Gable.
Encablure.....	Cable's length.	Pilote.....	Pilot.
Entrée.....	Entrance, mouth of a river.	Pin.....	Pine or fir tree.
Escarpé, e.....	Bluff.	Plage.....	Shore, beach.
Étale.....	(Of tide) slack; (of wind) settled.	Plateau.....	Tableland, or flat below water.
Étang.....	Lake.	Pleine mer.....	High water.
Étarqué.....	Hoisted (as a sail, flag, or time ball).	Pointe.....	Point.
Étiage.....	Low-water mark of a river.	Pont.....	Bridge, deck.
Étier.....	A creek which can receive small vessels; a conduit by which salt water enters a lake to be transformed into salt.	Port.....	Port, harbor.
		Presqu'île.....	Peninsula.
		Qual.....	Quay, wharf.
		Rade.....	Road, roadstead.
		Rafale.....	Squall.
		Raz (<i>Bas Breton</i>).....	A name given to a violent tidal stream in a narrow passage.
		Rivière.....	River.

FRENCH—Continued.

French.	English.	French.	English.
Roehe.....	Rock.	Tribord.....	Starboard.
Rocher.....	Rock.	Usine.....	Factory.
Rouge.....	Red.	Vase.....	Mud.
Sable.....	Sand.	Vent.....	Wind.
Salines.....	Salt-water lagoon, salt works.	Vergue.....	Yard.
Seuil.....	Sill (as of a dock).	Vert.....	Green.
Temps.....	Time, weather.	Vieux, viell, vieille.....	Old, ancient.
Tour.....	Tower.	Village.....	Village.
Tourelle.....	Small tower, turret.	Ville.....	Town.
		Vives eaux.....	Spring tides.

ITALIAN.

Acqua.....	Water; a river with some important tributaries.	Isola.....	Island.
Acquitrino.....	Swamp.	Isoletto.....	Islet.
Albero.....	Tree, mast.	Istmo.....	Isthmus.
Alleria.....	Lookout.	Lago.....	Lake.
Alto, a.....	High, lofty.	Lazaretto.....	Quarantine quarters.
Alzata.....	Embankment.	Levante.....	East.
Ancoraggio.....	Ancorage.	Lume.....	Light.
Ansa.....	Creek.	Mares.....	Tide.
Approdo.....	Landing place.	Marina.....	Seashore, strand, a marine esplanade or landing place.
Arena.....	Sand.		
Argilla.....	Clay.	Meda.....	Beacon.
Bacino.....	Basin.	Molino, Mullino.....	Mill.
Baja, Baja.....	Bay.	Monte.....	Mountain.
Balza.....	Rock.	Moro.....	Headland.
Banco.....	Sand bank.	Muro.....	A wall; a house.
Barra.....	Bar.	Nero.....	Black.
Battello.....	Small boat.	Norte.....	North.
Bianco.....	White.	Nuovo.....	New.
Boa.....	Buoy.	Nuraghe, Sardinian.....	Ancient round tower or dwelling.
Bocca or Bocche.....	The mouth or entrance channel to a river, bay, or harbor.	Palude.....	Marsh, bog.
		Passo.....	Channel.
Boye.....	A buoy.	Penisola.....	Peninsula.
Braccio di O piedi.....	Fathom.	Piano.....	Flat, level, low.
Burrasca.....	Squall.	Planura.....	Plain.
Cala, Calanca.....	Creek or small bay.	Piazza.....	Square, market.
Campanile.....	Belfry, tower.	Piccolo.....	Little.
Canal.....	A passage or channel.	Pietra.....	Stone.
Capo.....	Cape or headland.	Ploggia.....	Rain.
Carbon fossile.....	Coal.	Piana and Piana.....	A plain, seashore, a beach.
Caricatori.....	A loading or shipping place.	Ponente.....	West.
Casino.....	Country house.	Ponte.....	Bridge.
Castel, Castello.....	Castle.	Porta.....	An entrance gate.
Chiesa.....	Church.	Pórtó.....	Port or harbor.
Cima.....	Summit.	Posta della lettere.....	Post office.
Citta.....	City.	Punta.....	Point, peak.
Colle.....	Hill.	Rada.....	Roadstead.
Corpo di Guardia.....	Guardhouse.	Riva.....	Shore, coast.
Corto, a.....	Short.	Rocca.....	Rock.
Dársena.....	A wet dock or basin.	Rosso.....	Red.
Dogána.....	Customhouse.	Sabia.....	Sand.
Erto.....	Steep.	Salina.....	Salt-water lagoons, salt-terns, salt pans.
Fanale.....	Light.		
Fanno.....	Mud.	Sanita.....	Health office.
Faro.....	Lighthouse.	Sasso.....	Stone.
Faro.....	Strait.	Scala.....	Landing place or stairs.
Ferro.....	Iron.	Scogli.....	Rock awash.
Ferrovia.....	Railway.	Scogliera.....	Reef of rocks.
Fisso.....	Fixed.	Scoglio.....	Rock above water.
Flumára.....	River.	Secca.....	Sand bank, shallows.
Flume.....	River.	Selva.....	Forest.
Flumicino.....	Rivulet.	Seno.....	Creek or small bay.
Folgiori.....	Flashing.	Stagno.....	Salt lake.
Fondo.....	Deep bottom.	Strada.....	Road.
Forte.....	Fort.	Stretto.....	Strait.
Fortezza.....	Fortress.	Testa.....	Head of a rock.
Gavitello.....	Buoy.	Tonnara.....	Tunny fishery.
Ghiaccio.....	Ice.	Torrénte.....	Watercourse, rushing stream.
Ghiaja.....	Gravel.		
Grante.....	Revolving.	Tórré.....	Tower.
Golfo.....	Gulf, or large bay.	Valle.....	Valley.
Grado.....	A step or landing place.	Vecchia.....	Old.
Grande.....	Great.	Vento.....	Wind.
Guado.....	Ford.	Verde.....	Green.
Imboccatura.....	Mouth of a river.	Via.....	Road.

POINTS OF THE COMPASS OF THE CHIEF MARITIME COUNTRIES IN THE WESTERN BASIN OF THE MEDITERRANEAN.

English.	Spanish.	French.	Italian.	German, by Austria.
North.....	Norte.....	Nord.....	Tramontana.....	Norden.
N. by E.....	N. c. N. E.....	N. q. N. E.....	T. q. G.....	N. z. O.
N. N. E.....	N. N. E.....	N. N. E.....	G. T.....	N. N. O.
N. E. by N.....	N. E. c. N.....	N. E. q. N.....	G. q. T.....	N. O. z. N.
N. E.....	N. E.....	N. E.....	Greco.....	N. O.
N. E. by E.....	N. E. c. E.....	N. E. q. E.....	G. q. L.....	N. O. z. O.
E. N. E.....	E. N. E.....	E. N. E.....	G. L.....	O. N. O.
E. by N.....	E. c. N. E.....	E. q. N. E.....	L. q. G.....	O. z. N.
East.....	Este.....	Est.....	Levante.....	Osten.
E. by S.....	E. c. S. E.....	E. q. S. E.....	L. q. S.....	O. z. S.
E. S. E.....	E. S. E.....	E. S. E.....	S. L.....	O. S. O.
S. E. by E.....	S. E. c. E.....	S. E. q. E.....	S. q. L.....	S. O. z. O.
S. E.....	S. E.....	S. E.....	Scirocco.....	S. O.
S. E. by S.....	S. E. c. S.....	S. E. q. S.....	S. q. O., or S. q. M.....	S. O. z. S.
S. S. E.....	S. S. E.....	S. S. E.....	O. S., or M. S.....	S. S. O.
S. by E.....	S. c. S. E.....	S. q. S. E.....	O. q. S., or M. q. S.....	S. z. O.
South.....	Sur.....	Sud.....	Ostro, or Mezzo Giorno.	Suden.
S. by W.....	S. c. S. O.....	S. q. S. O.....	O. q. L., or M. q. L.....	S. z. W.
S. S. W.....	S. S. O.....	S. S. O.....	O. L., or M. L.....	S. S. W.
S. W. by S.....	S. O. c. S.....	S. O. q. S.....	L. q. O., or L. q. M.....	S. W.
S. W.....	S. O.....	S. O.....	Libecio.....	S. W. z. S.
S. W. by W.....	S. O. c. O.....	S. O. q. O.....	L. q. P.....	S. W. z. W.
W. S. W.....	O. S. O.....	O. S. O.....	P. L.....	W. S. W.
W. by S.....	O. c. S. O.....	O. q. S. O.....	P. q. L.....	W. z. S.
West.....	Oeste.....	Ouest.....	Ponente.....	Westen.
W. by N.....	O. c. N. O.....	O. q. N. O.....	P. q. M.....	W. z. N.
W. N. W.....	O. N. O.....	O. N. O.....	P. M.....	W. N. W.
N. W. by W.....	N. O. c. O.....	N. O. q. O.....	M. q. P.....	N. W. z. W.
N. W.....	N. O.....	N. O.....	Maestro.....	N. W.
N. W. by N.....	N. O. c. N.....	N. O. q. N.....	M. q. T.....	N. W. z. N.
N. N. W.....	N. N. O.....	N. N. O.....	M. T.....	N. N. W.
N. by W.....	N. c. N. O.....	N. q. N. O.....	T. q. M.....	N. z. W.
Compass card..	Rosa de Com- pas.	Rose de Vents.	Rosa della Bus- sola, or Fiore del Mondo.	Compass Rose.

NOTES.—On the Spanish compass c. stands for cuarto, or $\frac{1}{4}$; on the French, q. for quart, or $\frac{1}{4}$; and on the Italian, q. for quarto, or $\frac{1}{4}$; thus the Italian T. q. G. signifies Tramontana quarto, or $\frac{1}{4}$ Greco, or N., a quarter of the N. E. division of the compass of 45°, which is expressed by the English N. by E. In the German compass, z. is the abbreviation of zu or zum for the English equivalent “by.”

INFORMATION RELATING TO NAVIGATIONAL AIDS AND GENERAL NAVIGATION.

THE CORRECTION OF CHARTS, LIGHT LISTS, AND SAILING DIRECTIONS.

The following publications are issued by the United States Hydrographic Office as guides to navigation: Charts, Chart Catalogues, Sailing Directions, Light Lists, Tide Tables, Notices to Mariners, Pilot Charts, and Hydrographic Bulletins. Of these, the Notices to Mariners and the Hydrographic Bulletins are free to mariners and others interested in shipping. The Pilot Charts are free to contributors of professional information, but are sold to the general public at 10 cents a copy. The other publications of the office are sold under the law at cost price.

The Charts, the Sailing Directions, and the Light Lists are all affected by continual changes and alterations, concerning which information from all parts of the world is published weekly in the Notices to Mariners.

The charts are always corrected for all available information up to the date of issue stamped upon them; and the Light Lists should be noted for the recent alterations and additions. The Sailing Directions, however, can not, from their nature, be so fully corrected, and in all cases where they differ from the charts, the charts must be taken as the guide.

Charts.—When issued from the Hydrographic Office, the charts have received all necessary corrections to date.

All small but important corrections that can be made by hand are given in the Notices to Mariners, and should at once be placed on the charts to which they refer.

Extensive corrections that can not be conveniently thus made are put upon the plates, and new copies are put on sale. Masters of vessels are urged to replace the old charts, which should be destroyed to prevent the possibility of their being used in the navigation of the ship.

The dates on which extensive corrections are made are noted on the chart on the right of the middle of the lower edge; those of the smaller corrections at the left lower corners.

The edition, and corresponding date, of the chart will be found in the right lower corner, outside the outer neat line.

In all cases of quotations of charts, these dates of corrections should be given, as well as the number of the chart (found in the lower right and upper left corners), in order that the edition of the chart referred to may be known.

The Light Lists are corrected before issue, and all changes are published in the weekly Notices to Mariners.

The navigating officer should make notations in the tabular form in the Light Lists and paste in at the appropriate places slips from the Notices to Mariners.

The Light Lists should always be consulted as to the details of a light, as the description in the sailing directions is not complete, and may be obsolete, in consequence of changes since publication.

The Sailing Directions or Pilots are kept corrected by addenda; and subsequent to date of last addenda, they should be kept corrected by means of the Notices to Mariners. Sailing Directions issued to naval vessels carry with them an envelope containing slips of corrections up to date of issue.

Addenda are published from time to time, and contain a summary of all the information received up to date since the publication of the volume to which they refer, canceling all previous Notices to Mariners.

To enable the books to be more conveniently corrected, addenda and Notices to Mariners are printed on one side only, and two copies of the latter are issued to each naval vessel, one to be cut and the slips pasted in at the appropriate places, the other to be retained intact for reference.

To paste in the slips, as the Notices to Mariners are received, is one of the duties of the navigating officer, demanding faithful attention.

It must, however, be understood that Sailing Directions will rarely be correct in all details, and that, as already stated, when differences exist, the chart, which should be corrected from the most recent information, should be taken as the guide, for which purpose, for ordinary navigation, it is sufficient.

The Tide Tables, which are published annually by the United States Coast and Geodetic Survey, give the predicted times and heights of the high and the low waters for every day in the year at 70 of the principal ports of the world, and, through the medium of these by means of tidal differences and ratios, at a very large number of subordinate ports. The tables for the Atlantic and the Pacific coast ports of the United States are also published separately.

It should be remembered that these tables aim to give the times of high and low water, and not the times of turning of the current or of slack water, which may be quite different.

Notices to Mariners, containing fresh information pertaining to all parts of the world, are published weekly and mailed to all

United States ships in commission, Branch Hydrographic offices and agencies, and United States consulates. Copies are furnished free by the main office or by any of the branch offices on application.

With each Notice to naval vessels is sent also a separate sheet, giving the items relating to lights contained in the latest Notice, intended especially for use in correcting the Light Lists.

Pilot Charts of the North Atlantic, Central American Waters, and North Pacific and Indian Oceans are published each month, and of the South Atlantic and South Pacific Oceans each quarter. These charts give the average conditions of wind and weather, barometer, percentage of fog and gales, routes for steam and sailing vessels for the period of issue, ice and derelicts for the preceding period, ocean currents and magnetic variation for the current year, storm tracks for preceding years, and much other useful information. They are furnished free only in exchange for marine data or observations.

Hydrographic Bulletins, published weekly, are supplemental to the Pilot Charts, and contain the latest reports of obstructions and dangers along the coast and principal ocean routes, ice, derelicts, and wreckage, reports of the use of oil to calm the sea, and other information for mariners. They are to be had free upon application.

THE USE OF CHARTS.

Accuracy of chart.—The value of a chart must manifestly depend upon the character and accuracy of the survey on which it is based, and the larger the scale of the chart the more important do these become.

To judge of a survey, its source and date, which are generally given in the title, are a good guide. Besides the changes that may have taken place since the date of the survey, in waters where sand or mud prevails, the earlier surveys were mostly made under circumstances that precluded great accuracy of detail; until a chart founded on such a survey is tested, it should be regarded with caution. It may, indeed, be said that, except in well-frequented harbors and their approaches, no surveys yet made have been so thorough as to make it certain that all dangers have been found. The number of the soundings is another method of estimating the completeness of the survey, remembering, however, that the chart is not expected to show all the soundings that were obtained. When the soundings are sparse or unevenly distributed, it may be taken for granted that the survey was not in great detail.

Large or irregular blank spaces among soundings mean that no soundings were obtained in these spots. When the surrounding soundings are deep it may fairly be assumed that in the blanks the water is also deep; but when they are shallow, or it can be

seen from the rest of the chart that reefs or banks are present, such blanks should be regarded with suspicion. This is especially the case in coral regions and off rocky coasts, and it should be remembered that in waters where rocks abound it is always possible that a survey, however complete and detailed, may have failed to find every small patch or pinnacle rock.

A wide berth should therefore be given to every rocky shore or patch, and instead of considering a coast to be clear, the contrary should be assumed.

Fathom curves a caution.—Except in charts of harbors that have been surveyed in detail, the 5-fathom curve on most charts may be considered as a danger line or caution against unnecessarily approaching the shore or bank within that line, on account of the possible existence of undiscovered inequalities of the bottom, which only an elaborate detailed survey could reveal. In general surveys of coasts or of little frequented anchorages, the necessities of navigation do not demand the great expenditure of time required for so detailed a survey. It is not contemplated that ships will approach the shores in such localities without taking special precautions.

The 10-fathom curve on rocky shores is another warning, especially for ships of heavy draft.

• A useful danger curve will be obtained by tracing out with a colored pencil, or ink, the line of depth next greater than the draft of the ship using the chart. For vessels drawing less than 18 feet the edge of the sanding serves as a well-marked danger line.

Charts on which no fathom curves are marked must especially be regarded with caution, as indicating that soundings were too scanty and the bottom too uneven to enable the curves to be drawn with accuracy.

Isolated soundings, shoaler than surrounding depths, should always be avoided, especially if ringed around, as it is doubtful how closely the spot may have been examined and whether the least depth has been found.

The chart on largest scale should always be used on account of its greater detail and the greater accuracy with which positions may be plotted on it.

Caution in using small-scale charts.—In approaching the land or dangerous banks, regard must always be had to the scale of the chart used. A small error in laying down a position means only yards on a large-scale chart, whereas on one of small scale the same amount of displacement means a large fraction of a mile.

Distortion of printed charts.—The paper on which charts are printed from engraved plates has to be damped. On drying distortion takes place from the inequalities of the paper, which greatly

varies with different papers and the amount of the damping; but it does not affect navigation. The larger the chart the greater the amount of this distortion. It must not, however, be expected that accurate series of angles taken to different points will always exactly agree when carefully plotted on the chart, especially if the lines to objects be long.

Mercator chart.—Observed bearings are not identical with those measured on the Mercator chart (excepting only the bearings north and south, and east and west on the equator) because the line of sight, except as affected by refraction, is a straight line and lies in the plane of the great circle, while the straight line on the chart (except the meridian line) represents, not the arc of a great circle, but the loxodromic curve, or rhumb line, which on the globe is a spiral approaching but never in theory reaching the pole, or, if the direction be east and west, a circle of latitude.

The difference is not appreciable with near objects, and in ordinary navigation may be neglected. But in high latitudes, when the objects are very distant and especially when lying near east or west, the bearings must be corrected for the convergence of the meridians in order to be accurately placed on the Mercator chart, which represents the meridians as parallel.

On the polyconic chart, since a straight line represents (within the limits of 15 or 20 degrees of longitude) the arc of a great circle or the shortest distance between two points, bearings of the chart are identical with observed bearings.

The mercator projection is unsuited to surveying, for which purpose the polyconic projection is used by the Hydrographic Office and the Coast and Geodetic Survey.

Notes on charts should always be read with care, as they may give important information that can not be graphically represented.

Buoys.—Too much reliance should not be placed on buoys always maintaining their exact positions. They should therefore be regarded as warnings, and not as infallible navigational marks, especially when in exposed places and in the wintertime; and a ship's position should always, when possible, be checked by bearings or angles of fixed objects on shore.

Gas buoys.—The lights shown by gas buoys can not be implicitly relied on; the light may be altogether extinguished, or, if periodic, the apparatus may get out of order.

Whistle and bell buoys are sounded only by the action of the sea; therefore, in calm weather, they are less effective or may not sound.

Lights.—All the distances given in the Light Lists and on the charts for the visibility of lights are calculated for a height of 15 feet for the observer's eye. The effect of a greater or less height

of eye can be ascertained by means of the table of distances of visibility due to height, published in the Light Lists.

The glare of a powerful light is often seen far beyond the limit of visibility of the actual rays of the light, but this must not be confounded with the true range. Refraction, too, may often cause a light to be seen farther than under ordinary circumstances.

When looking out for a light, the fact may be forgotten that aloft the range of vision is much increased. By noting a star immediately over the light a very correct bearing may be obtained from the standard compass when you lay down from aloft.

On first making a light from the bridge, by at once lowering the eye several feet and noting whether the light is made to dip, it may be determined whether the ship is on the circle of visibility corresponding with the usual height of the eye, or unexpectedly nearer the light.

The intrinsic power of a light should always be considered when expecting to make it in thick weather. A weak light is easily obscured by haze, and no dependence can be placed on its being seen.

The power of a light can be estimated by its candlepower or order, as stated in the Light Lists, and in some cases by noting how much its visibility in clear weather falls short of the range corresponding to its height. Thus, a light standing 200 feet above the sea and recorded as visible only 10 miles in clear weather, is manifestly of little brilliancy, as its height would permit it to be seen over 20 miles if of sufficient power.

Fog signals.—Sound is conveyed in a very capricious way through the atmosphere. Apart from the influence of the wind large areas of silence have been found in different directions and at different distances from the origin of sound, even in clear weather; therefore, too much confidence should not be felt as to hearing a fog signal. The apparatus, moreover, for sounding the signal often requires some time before it is in readiness to act. A fog often creeps imperceptibly toward the land, and may not be observed by the lighthouse keepers until upon them; a ship may have been for many hours in it, and approaching the land in confidence, depending on the signal, which is not sounded. When sound travels against the wind, it may be thrown upward; a man aloft might then hear it though inaudible on deck.

The submarine bell system of fog signals is much more reliable than systems transmitting sound through the air, as sound traveling in water is not subject to the same disturbing influences; the fallibility of the lighthouse keeper is, however, about the same in all systems, so that caution should be observed even by vessels equipped with submarine-bell receiving apparatus.

Submarine bells have an effective range of audibility greater than signals sounded in air, and a vessel equipped with receiving apparatus may determine the approximate bearing of the signal. These signals may be heard also on vessels not equipped with receiving apparatus by observers below the water line, but the bearing of the signal can not then be readily determined.

Vessels equipped with radio apparatus and submarine bell receivers may fix their distance from a light vessel having radio and submarine bell, utilizing the difference in velocity of sound waves of the radio and the bell. Sound travels 4,794 feet per second at 66° F. in water, and the travel of radio sound waves for practicable distances may be taken as instantaneous.

All vessels should observe the utmost caution in closing the land in fogs. The lead is the safest guide and should be faithfully used.

Tides.—A knowledge of the times of high and low water and of the amount of vertical rise and fall of the tide is of great importance in the case of vessels entering or leaving port, especially when the low water is less than or near their draft. Such knowledge is also useful at times to vessels running close along a coast, in enabling them to anticipate the effect of the tidal currents in setting them on or offshore. This is especially important in fog or thick weather.

The predicted times and heights of the high and low waters, or differences by which they may be readily obtained, are given in the Tide Tables for all the important ports of the world. The height at any intermediate time may be obtained by means of Tables 2A and 2B for most of the principal tidal stations of the United States, given in Table 1, and for the subordinate stations of Table 3 by using them as directed in the Tide Tables. The intermediate height may also be obtained by plotting the predicted times and heights of high and low water and connecting the points by a curve. Such knowledge is often useful in crossing a bar or shallow flats.

Planes of reference.¹—The plane of reference for soundings on Hydrographic Office charts made from United States Government surveys and on Coast and Geodetic Survey charts of the Atlantic coast of the United States is mean low water; on the Pacific coast of the United States as far as the Strait of Juan Fuca, it is the mean of the lower low waters; and from Puget Sound to Alaska, the plane employed on Hydrographic Office charts is low water ordinary springs.

On most of the British Admiralty charts the plane of reference is the low water of ordinary springs; on French charts, the low water of equinoctial springs.

¹ The distinction between "rise" and "range" of the tide should be understood. The former expression refers to the height attained above the datum plane for soundings, differing with the different planes of reference; the latter, to the difference of level between successive high and low waters.

In the case of many charts compiled from old or various sources the plane of reference may be in doubt. In such cases, or when ever not stated on the chart, the assumption that the reference plane is low water ordinary springs gives a larger margin of safety than mean low water.

Whichever plane of reference may be used for a chart it must be remembered that there are times when the tide falls below it. Low water is lower than mean low water about half the time, and when a new or full moon occurs at perigee the low water is lower than the average low water of springs. At the equinoxes the spring range is also increased on the coasts of Europe, but in some other parts of the world, and especially in the Tropics, such periodic low tides may coincide more frequently with the solstices.

Wind or a high barometer may at times cause the water to fall below even a very low plane of reference.

On coasts where there is much diurnal inequality in the tides, the amount of rise and fall can not be depended upon and additional caution is necessary.

Mean sea level.—The important fact should be remembered that the depths at half tide are practically the same for all tides, whether neaps or springs. Half tide therefore corresponds with mean sea level. This makes a very exact plane of reference, easily found, to which it would be well to refer all high and low waters.

The Tide Tables give in Table 3, for all the ports, the plane of reference to which tidal heights are referred and its distance below mean sea level.

If called on to take special soundings for the chart at a place where there is no tidal bench mark, mean sea level should be found and the plane for reductions established at the proper distance below it, as ascertained by the Tide Tables, or by observations, or in some cases, if the time be short, by estimation, the data used being made a part of the record.

Tidal streams.—In navigating coasts where the tidal range is considerable, especial caution is necessary. It should be remembered that there are indrafts to all bays and bights, although the general run of the stream may be parallel with the shore.

The turn of the tidal stream offshore is seldom coincident with the times of high and low water on the shore. In some channels the tidal stream may overrun the turn of the vertical movement of the tide by three hours, forming what is usually known as tide and half tide, the effect of which is that at high and low water by the shore the stream is running at its greatest velocity.

The effect of the tidal wave in causing currents may be illustrated by two simple cases.

(1) Where there is a small tidal basin connected with the sea by a large opening.

(2) Where there is a large tidal basin connected with the sea by a small opening.

In the first case the velocity of the current in the opening will have its maximum value when the height of the tide within is changing most rapidly, i. e., at a time about midway between high and low water. The water in the basin keeps at approximately the same level as the water outside. The flood stream corresponds with the rising and the ebb with the falling of the tide.

In the second case the velocity of the current in the opening will have its maximum value when it is high water or low water without, for then there is the greatest head of water for producing motion. The flood stream begins about three hours after low water, and the ebb stream about three hours after high water, slack water thus occurring about midway between the tides.

Along most shores not much affected by bays, tidal rivers, etc., the current usually turns soon after high water and low water.

The swiftest current in straight portions of tidal rivers is usually in the middle of the stream, but in curved portions the most rapid current is toward the outer edge of the curve, and here the water will be deepest. The pilot rule for best water is to follow the ebb tide reaches.

Countercurrents and eddies may occur near the shores of straits, especially in bights and near points. A knowledge of them is useful in order that they may be taken advantage of or avoided.

A swift current often occurs in a narrow passage connecting two large bodies of water, owing to their considerable difference of level at the same instant. The several passages between Vineyard Sound and Buzzards Bay are cases in point. In the Woods Hole passage the maximum strength of the tidal streams is at about half tide.

Tide rips are made by a rapid current setting over an irregular bottom, as at the edges of banks where the change of depth is considerable.

Current arrows on charts show only the most usual or the mean direction of a tidal stream or current; it must not be assumed that the direction of a stream will not vary from that indicated by the arrow. The rate, also, of a stream constantly varies with circumstances, and the rate given on the chart is merely the mean of those found during the survey, possibly from very few observations.

FIXING POSITION.

Sextant method.—The most accurate method available to the navigator of fixing a position relative to the shore is by plotting with a protractor, sextant angles between three well-defined objects on

shore which are shown on the chart; this method, based on the "three-point problem" of geometry, should be in general use.

For its successful employment it is necessary: First, that the objects be well chosen; and, second, that the observer be skillful and rapid in his use of the sextant. The latter is only a matter of practice. Two observers are better for this method.

Near objects should be used either for bearings or angles for position in preference to distant ones, although the latter may be more prominent, as a small error in the bearing or angle or in laying it on the chart has a greater effect in misplacing the position the longer the line to be drawn.

On the other hand distant objects should be used for direction, because less affected by a small error or change of position.

The three-arm protractor or station pointer consists of a graduated brass circle with one fixed and two movable radial arms, the three beveled edges of the arms, if produced, intersecting at the exact center of the instrument. The edge of the fixed arm marks the zero of the graduation which enables the movable arms to be set at any angles with the fixed arm.

To plot a position, the two angles observed between the three selected objects are set on the instrument, which is then moved over the chart until the three beveled edges pass respectively and simultaneously through the three objects. The center of the instrument will then mark the ship's position, which may be pricked on the chart or marked with a pencil point through the center hole.

The transparent xylonite protractor is an excellent substitute for the brass instrument and in some cases preferable to it, as when, for instance, the objects angled on are so near the observer that they are more or less hidden by the circle of the instrument. The xylonite protractor also permits the laying down for simultaneous trial of a number of angles in cases of fixing important positions. Plain tracing paper may also be used if there are any suitable means of laying off the angles.

The value of a determination depends greatly on the relative positions of the objects observed. If the position sought lies on the circle passing through three objects (in which case the sum of the observed angles equals the supplement of the angle at the middle object made by lines from the other two) it will be indeterminate, as it will plot all around the circle. Such an observation is called a "revolver." An approach to this condition must be avoided. Near objects are better than distant ones, and, in general, up to 90° the larger the angles the better, remembering always that large as well as small angles may plot on or near the circle and hence be worthless. If the objects are well situated, even very small angles will give for

navigating purposes a fair position, when that obtained by bearings of the same objects would be of little value.

Accuracy requires that the two angles be simultaneous. If under way and there is but one observer the angle that changes less rapidly may be observed both before and after the other angle and the proper value obtained by interpolation.

A single angle and a range of two objects give in general an excellent fix, easily obtained and plotted.

Advantages of sextant method.—In many narrow waters where the objects may yet be at some distance, as in coral harbors or narrow passages among mud banks, navigation by sextant and protractor is invaluable, as a true position can in general be obtained only by its means. Positions by bearings are too rough to depend upon, and a small error in either taking or plotting a bearing might under such circumstances put the ship ashore.

In all cases where great accuracy of position is desired, such as the fixing of a rock or shoal, or of fresh soundings or new buildings as additions to the chart, the sextant should invariably be used. In all such cases angles should be taken to several objects, the more the better; but five objects is a good number, as the four angles thus obtained not only prevent any errors, but they at once furnish a means of checking the accuracy of the chart itself. If a round of angles can be taken the observer's accuracy is also checked. In the case of ordinary soundings a third angle need be taken only occasionally; first, to check the general accuracy of the chart, as above stated; second, to make certain that the more important soundings, as at the end of a line, are correctly placed.

If communication can be had with the shore, positions may be fixed with great accuracy by occupying with theodolite or sextant two known points of the chart. The third angle of the triangle, that between the two points at the position sought, should be measured as a check.

The compass.—It is not intended that the use of the compass to fix the ship should be given up; in ordinary piloting the compass, with its companion, the pelorus, may be usefully employed for this purpose, although less accurate than the sextant.

If the accuracy of the chart is doubtful, the compass should be used in preference to the sextant.

In fixing by the compass, it should always be remembered that a position by two bearings only, like that by two angles only, is liable to error. An error may be made in taking a bearing, or in applying to it the deviation, or in laying it on the chart. A third or check bearing should, therefore, be taken of some other object, especially when near the shore or dangers. A common intersection for the three lines assures accuracy.

When the three lines do not intersect in a point, the following rule holds: If the line drawn to the middle object falls to the right of the point of intersection of the lines to the two outside objects, the position of the observer was to the right of the line to the middle object; and if it falls to the left of the intersection his position was to the left of the line. Thus it will be seen that the assumption, that the position is at the center of the triangle formed by the intersecting lines, is incorrect.

Doubling the angle on the bow.—The method of fixing by doubling the angle on the bow is invaluable. The ordinary form of it, the so-called "bow and beam bearing," the distance from the object at the latter position being the distance run between the times of taking the two bearings, gives the maximum of accuracy, and is an excellent fix for a departure, but does not insure safety, as the object observed and any dangers off it are abeam before the position is obtained.

By taking the bearings at two points and four points on the bow, a fair position is obtained before the object is passed, the distance of the latter at the second position being, as before, equal to the distance run in the interval, allowing for current. Taking afterwards the beam bearing gives, with slight additional trouble, the distance of the object when abeam; such beam bearings and distances, with the times, should be continuously recorded as fresh departures, the importance of which will be appreciated in cases of being suddenly shut in by fog.

When the first bearing is $26\frac{1}{2}^\circ$ from ahead, and the second 45° , the run between bearings will equal the distance at which the object will be passed abeam.

A table of multipliers of the distance run in the interval between any two bearings of an object, the product being its distance at the time of the second bearing, is given in the Light Lists and in Bowditch.

Danger angle.—The utility of the danger angle in passing outlying rocks or dangers should not be forgotten. In employing the horizontal danger angle, however, caution is necessary, as should the chart be inaccurate, i. e., should the objects selected be not quite correctly placed, the angle taken off from it may not serve the purpose. It should not, therefore, be employed when the survey is old or manifestly imperfect.

The vertical danger angle may be conveniently used when passing elevated points of known heights, such as lighthouses, cliffs, etc. The computation of the distance corresponding to the height of the object and its angular elevation requires for small distances merely the solution of a plain right triangle; the natural cotangent of the angle multiplied by the height in feet gives the distance in

feet. The convenient use of this method, however, requires tables such as those published by Capt. Lecky in his little book entitled "The Danger Angle and Offshore Distance Tables." This book very usefully extends the vertical angle method to finding a ship's position at sea by observing the angular altitude of a peak of known height and its bearing. The tables give heights up to 18,000 feet and distances up to 110 miles.

When the angles are not too large they should be observed "on and off the limb" and the index error of the sextant thus eliminated, in preference to correcting for it the single altitude. It must be remembered that in high latitudes the bearing of a distant object needs correction for the convergence of the meridians before being laid down on a Mercator chart. The correction may be found by the following formula, using the approximate position: The sine of the correction equals the product of the sine of half the difference of longitude by the sine of the middle latitude. It is applied on the equatorial side of the observed bearing and its effect is always to increase the latitude of the observer.

Soundings taken at random are of little value in fixing or checking position and may at times be misleading. In thick weather, when near or closing the land, soundings should be taken continuously and at regular intervals, and, with the character of the bottom, systematically recorded. By laying the soundings on tracing paper, according to the scale of the chart, along a line representing the track of the ship, and then moving the paper over the chart, keeping the line representing the track parallel with the course until the observed soundings agree with those of the chart, the ship's position will in general be quite well determined. This plan was suggested by Lord Kelvin, whose admirable sounding machine renders the operation of sounding possible in quite deep water, without slowing down the ship and consequent loss of time.

Pelorus.—All ships should be supplied with the means of taking accurate bearings both by night and by day. The standard compass is not always conveniently placed for the purpose; in such case a pelorus will be very useful, but the results are not as accurate as those obtained direct from the compass. The utility of such an instrument in ascertaining the change of bearing of an approaching ship should not be overlooked.

Position lines.—Among the various methods of fixing position at sea, the one which should be best understood and put to the most constant use is that employing position or Sumner lines. These lines give the most comprehensive information to the navigator with the least expenditure of labor and time. The knowledge gained is that the vessel must be somewhere on the line, provided the data used is accurate and the chronometer correct. As the information

given by one line of position is not sufficient to determine the definite location of the vessel, it is necessary to cross this line by another similarly obtained, and the vessel being somewhere on both must be at their intersection. However, a single line, at times, will furnish the mariner with invaluable information; for instance, if it is directed toward the coast, it marks the bearing of a definite point on the shore, or if parallel to the coast it clearly indicates the distance off, and so will often be found useful as a course. A sounding taken at the same time with the observation will in certain conditions prove of great value in giving an approximate position on the line.

The easiest and quickest way to establish a line of position is by employing the method of Marcq St. Hilaire, as modified by the use of tables of altitude. The principle of this method is one of altitude differences, in which the observed altitude is compared with the computed altitude for a dead reckoning, or other selected position, and the difference in minutes of latitude measured toward the body along the line of its azimuth, if the observed altitude is greater than the computed altitude, and vice versa. A line drawn at right angles to the line of azimuth through the point thus determined is the position line, somewhere upon which will be found the position of the vessel. The tables of altitude obviate the computation of the altitude and thereby greatly facilitate the establishment of the line.

A position line may also be found by computing two positions for longitude with two assumed latitudes, and drawing the line between them; or by drawing to the position obtained with one latitude a line at right angles to the bearing of the body as taken from the azimuth tables.

A very accurate position can be obtained by observing two or more stars at morning or evening twilight, at which time the horizon is well defined. The position lines thus obtained will, if the bearings of the stars differ three points or more, give an excellent result. A star or planet at twilight and the sun afterwards or before may be combined; also two observations of the sun with sufficient interval to admit of a considerable change of bearing. In these cases one of the lines must be moved for the run of the ship. The moon is often visible during the day and in combination with the sun gives an excellent fix.

The morning and evening twilight observations, besides their great accuracy, possess the additional advantage of greatly extending the ship's reliable reckoning beyond the limits of the ordinary day navigation, and correspondingly restricting the dead reckoning uncertainties of the night. An early morning fix in particular is often of great value. Though the same degree of

accuracy as at twilight can not be expected, night observations are very valuable and should be assiduously practiced.

Piloting.—The navigator, in making his plan for entering a strange port, should give very careful previous study to the chart and sailing directions, and should select what appear to be the most suitable marks for use, also providing himself with substitutes to use in case those selected as most suitable should prove unreliable in not being recognized with absolute certainty. Channel buoys seen from a distance are difficult to identify, because their color is sometimes not easily distinguished and they may appear equally distant from the observer even though they be at widely varying distances. Ranges should be noted, if possible, and the lines drawn, both for leading through the best water in channels, and also for guarding against particular dangers; for the latter purpose safety bearings should in all cases be laid down where no suitable ranges appear to offer. The courses to be steered in entering should also be laid down and distances marked thereon. If intending to use the sextant and danger angle in passing dangers, and especially in passing between dangers, the danger circles should be plotted and regular courses planned, rather than to run haphazard by the indications of the angle alone, with the possible trouble from bad steering at critical points.

The ship's position should not be allowed to be in doubt at any time, even in entering ports considered safe and easy of access, and should be constantly checked, continuing to use for this purpose those marks concerning which there can be no doubt until others are unmistakably identified.

The ship should ordinarily steer exact courses and follow an exact line, as planned from the chart, changing course at precise points, and, where the distances are considerable, her position on the line should be checked at frequent intervals. This is desirable even where it may seem unnecessary for safety, because if running by the eye alone and the ship's exact position be immediately required, as in a sudden fog or squall, fixing at that particular moment may be attended with difficulty.

The habit of running exact courses with precise changes of course will be found most useful when it is desired to enter port or pass through inclosed waters during fog by means of the buoys; here safety demands that the buoys be made successively, to do which requires, if the fog be dense, very accurate courses and careful attention to the times, the speed of the ship, and the set of the current; failure to make a buoy as expected leaves, as a rule, no safe alternative but to anchor at once, with perhaps a consequent serious loss of time.

In passing between dangers where there are no suitable leading marks, as, for instance, between two islands or an island and the main shore, with dangers extending from both, a mid-channel course may be steered by the eye alone with great accuracy, as the eye is able to estimate very closely the direction midway between visible objects.

In piloting among coral reefs or banks, a time should be chosen when the sun will be astern, conning the vessel from aloft or from an elevated position forward. The line of demarcation between the deep water and the edges of the shoals, which generally show as green patches, is indicated with surprising clearness. This method is of frequent application in the numerous passages of the Florida Keys.

Changes of course should in general be made by exact amounts, naming the new course or the amount of the change desired, rather than by ordering the helm to be put over and then steadying when on the desired heading, with the possibility of the attention being diverted and so of forgetting in the meantime, as may happen, that the ship is still swinging. The helmsman, knowing just what is desired and the amount of the change to be made, is thus enabled to act more intelligently and to avoid bad steering, which in narrow channels is a very positive source of danger.

Coast piloting involves the same principles and requires that the ship's position be continuously determined or checked as the landmarks are passed. On well-surveyed coasts there is a great advantage in keeping near the land, thus holding on to the marks and the soundings, and thereby knowing at all times the position, rather than keeping offshore and losing the marks, with the necessity of again making the land from vague positions, and perhaps the added inconvenience of fog or bad weather, involving a serious loss of time and fuel.

The route should be planned for normal conditions of weather, with suitable variations where necessary in case of fog or bad weather or making points at night, the courses and distances, in case of regular runs over the same route, being entered in a notebook for ready reference, as well as laid down on the chart. The danger circles for either the horizontal or the vertical danger angles should be plotted, wherever the method can be usefully employed, and the angles marked thereon; many a mile may thus be saved in rounding dangerous points with no sacrifice in safety. Ranges should also be marked in, where useful for position or for safety, and also to use in checking the deviation of the compass by comparing, in crossing, the compass bearing of the range with its magnetic bearing, as given by the chart.

Changes of course will in general be made with mark or object abeam, the position (a new "departure") being then, as a rule, best and most easily obtained. The pelorus should be at all times in readiness for use, and the chart where it may be readily consulted by the officer of the watch. The sextant should also be kept conveniently at hand.

A continuous record of the progress of the ship should be kept by the officer of the watch, the time and patent-log reading of all changes of course and of all bearings, especially the two and four point bearings, with distance of object when abeam, being noted in a book kept in the pilot house for this especial purpose. The ship's reckoning is thus continuously cared for as a matter of routine and without the presence or particular order of the captain or navigating officer. The value of thus keeping the reckoning always fresh and exact will be especially appreciated in cases of sudden fog or when making points at night.

Where the coastwise trip must be made against a strong head wind, it is desirable, with trustworthy charts, to skirt the shore as closely as possible in order to avoid the heavier seas and adverse current that prevail farther out. In some cases, with small ships, a passage can be made only in this way. The important saving of coal and of time, which is even more precious, thus effected by skillful coast piloting makes this subject one of prime importance to the navigator.

Change in the variation of the compass.¹—The gradual change in the variation must not be forgotten in laying down on the chart courses and bearings. The magnetic compasses placed on the charts for the purpose of facilitating the plotting become in time slightly in error, and in some cases, such as with small scales or when the lines are long, the displacement of position from neglect of this change may be of importance. The date of the variation and the annual change, as given on the compass rose, facilitate corrections when the change has been considerable. The compasses are reengraved once in ten years; more frequent alterations on one spot in a copperplate would not be practicable.

The change in the variation is in some parts of the world so rapid as to need careful consideration, requiring a frequent change of the course. For instance, in approaching Halifax from Newfoundland the variation changes 10° in less than 500 miles.

Local magnetic disturbance of the compass on board ship.—The term "local magnetic disturbance" has reference only to the effects on the compass of magnetic masses external to the

¹ See H. O. Chart No. 2406, Variation of the Compass.

ship. Observation shows that disturbance of the compass in a ship afloat is experienced in only a few places on the globe.

Magnetic laws do not permit of the supposition that the visible land causes such disturbance, because the effect of a magnetic force diminishes so rapidly with distance that it would require a local center of magnetic force of an amount absolutely unknown to affect a compass half a mile distant.

Such deflections of the compass are due to magnetic minerals in the bed of the sea under the ship, and when the water is shallow and the force strong, the compass may be temporarily deflected when passing over such a spot; but the area of disturbance will be small unless there are many centers near together.

Use of oil for modifying the effect of breaking waves.—Many experiences of late years have shown that the utility of oil for this purpose is undoubted, and the application simple.

The following may serve for the guidance of seamen, whose attention is called to the fact that a very small quantity of oil, skillfully applied, may prevent much damage both to ships, especially of the smaller classes, and to boats by modifying the action of breaking seas.

The principal facts as to the use of oil are as follows:

1. On free waves, i. e., waves in deep water, the effect is greatest.
2. In a surf, or waves breaking on a bar, where a mass of liquid is in actual motion in shallow water, the effect of the oil is uncertain, as nothing can prevent the larger waves from breaking under such circumstances; but even here it is of some service.
3. The heaviest and thickest oils are most effectual. Refined kerosene is of little use; crude petroleum is serviceable when no other oil is obtainable, or it may be mixed with other oils; all animal and vegetable oils, such as waste oil from the engines, have great effect.
4. In cold water, the oil, being thickened by the low temperature and not being able to spread freely, will have its effect much reduced, a rapid-spreading oil should be used.
5. A small quantity of oil suffices, if applied in such a manner as to spread to windward.
6. It is useful in a ship or boat either when running, or lying-to, or in wearing.
7. When lowering and hoisting boats in a heavy sea the use of oil has been found greatly to facilitate the operation.
8. For a ship at sea the best method of application appears to be to hang over the side, in such a manner as to be in the water, small canvas bags, capable of holding from 1 to 2 gallons of oil, the bags being pricked with a sail needle to permit leakage. The waste pipes forward are also very useful for this purpose.

9. Crossing a bar with a flood tide, to pour oil overboard and allow it to float in ahead of the boat, which would follow with a bag towing astern, would appear to be the best plan.

On a bar, with the ebb tide running, it would seem to be useless to try oil for the purpose of entering.

10. For boarding a wreck, it is recommended to pour oil overboard to windward of her before going alongside, bearing in mind that her natural tendency is always to forge ahead. If she is aground the effect of oil will depend upon attending circumstances.

11. For a boat riding in bad weather to a sea anchor, it is recommended to fasten the bag to an endless line rove through a block on the sea anchor, by which means the oil can be diffused well ahead of the boat, and the bag readily hauled on board for refilling, if necessary.

CHAPTER I.

GENERAL REMARKS—COMMUNICATIONS—WINDS AND WEATHER—CURRENTS—TIDAL STREAMS—LIGHTS—PILOTAGE—BUOYAGE—PORT REGULATIONS—SEMAPHORES—WEATHER AND STORM SIGNALS—COAL SUPPLY—NAVAL ESTABLISHMENTS—DOCKS—FISHING VESSELS' LIGHTS—TUNNY FISHERIES—ROUTES.

NOTE.—This chapter should be read in connection with Chapter I of H. O. No. 151 Mediterranean Pilot, Volume I, which contains a description of the winds and weather in a portion of the western basin of the Mediterranean, together with other remarks common to the whole of that sea, and which are of great importance to the navigator.

General remarks.—The portion of the Mediterranean Sea described in this volume, comprises the south coast of France from Cape Cerbère, and the west coast of Italy to Cape Spartivento, including Messina Strait; the Islands of Sardinia, Corsica, the Tuscan Archipelago, the Islands of Sicily, Lipari or Æolian Islands, Maltese Islands and the Ægæan Isles.

The limits and distinctive features of the areas embraced in this publication, with the productions of the countries, will be found in detail on the following pages in this chapter.

The south coast of France, between Capes Cerbère and Martin, is about 400 miles in extent, and forms the seaboard of the three ancient Provinces of Rouissilon, Languedoc, and Provence, and now subdivided into seven departments, as follows: Pyrénées, Orientales, Aude, Hérault, Gard, Bouches du Rhône, Var, and Alpes Maritimes.

Deeply indented by the Gulf of Lyons, and broken by many smaller gulfs and bays, the coast presents a great variety of feature—between Port Vendres and Marseille the land is low and marshy, with a low sandy beach inclosing numerous étangs or salt lagoons; eastward of Marseille the shore becomes bold and rocky, rising in precipitous headlands. Within the last few centuries considerable accessions of land, caused by alluvial deposit, have taken place, particularly near the mouths of the Rhône.

The coast is generally clear of danger and may be approached in most places within 1 mile; safe and commodious harbors, and well-sheltered anchorages are numerous; amongst the former, Marseille, Toulon, Vendres, Cette, Antibes, and Villefranche are the principal.

The principal rivers are the Rhône, Tet, Aude, Herault, and Var; they are, however, navigable only for vessels of the smallest class.

The greatest elevations near the coast are the Puig de Saillfore (on the eastern fall of the Pyrenees and on the boundary between Spain and France), 2,605 feet in height; Montagne de Saint Cyr, or Carpiagne (near Marseille), 2,119 feet; Le Coudon and Mont des Pomets or de Caumes (near Toulon), 2,284 and 2,612 feet, respectively; and Mount Montagne Saint Pierre (in the department of Var), 1,362 feet high.

The commerce of this part of France is very considerable; the chief exports are wines and spirits, silk, sugar, soap, cork, salt, wheat, and flour. The vine, orange, citron, olive, fig, pomegranate, and mulberry are largely cultivated. There are fisheries of anchovy, sardine, and tunny.

The climate of the south of France is very variable; the summer is excessively hot, and the country appears scorched by the intense heat; the sky assumes a copper tint which overspreads everything with a lurid glare, the air is loaded with dust, and the hills present the appearance of bare masses of rock, being destitute of any covering of vegetation or soil. Frequently no rain falls in June, July, or August, and the usual amount during those months is very small. The great heat occurs between the middle of July and the end of September, yet in summer scorching heat alternates with piercing cold, the mistral or northwest wind being the cause of this sudden change. The mistral, which prevails chiefly in winter and spring is a most violent, bitterly cold, and dry wind, filling the atmosphere with a yellow haze. In winter (December to February), however, the weather is very fine, excepting when the mistral is blowing.

Italy (Italia) is bounded on the north by the Alps, on the east by the Adriatic, and on the west and south by the Mediterranean; the greater portion of it is a large peninsula extending about 500 miles in a southeast direction, and varying in breadth from 70 to 150 miles; its southern extremity is deeply indented by the Gulf of Taranto, giving its configuration the peculiar appearance familiarly known as "the boot," across which it is 180 miles wide.

The Kingdom of Italy includes Sicily and Sardinia (two of the largest and most important islands in the Mediterranean) the Tuscan Archipelago, the Lipari Islands, and several smaller groups comprising a total area of 110,659 square miles. The population in the year 1914 was 35,597,784.

Italy, proverbial for its beauty, its richness and capabilities, was consolidated under one Government in the year 1870.

The west coast of Italy, southward of the Gulf of Genoa, and as far as the Neapolitan division, is in general low and sandy, fronting a considerable extent of marsh and swamp, the country round which is thickly wooded, especially near the mouths of the Arno and Tiber. It is indented by many bays or gulfs, which are bounded by

prominent and elevated headlands, the most western being that of Piombino. The principal gulfs are Genoa, Gaeta, Naples, Salerno, Policastro, Eufemia, Gioja, Squillace, and Taranto, the latter being by far the most extensive.

The principal rivers are the Arno, Cicina, Ombrone, Tiber, Garigliano, Volturno, and the Brodano flowing into the Gulf of Taranto upon the south; the estuaries of these rivers, with the exception of the Tiber, are shallow and admit only the smallest class of coasting vessels.

The peninsula is traversed by the Appenine range, which to the southward approaches within a short distance of the Calabrian coast; Monte Corno, its highest peak, situated eastward of Rome, is 10,206 feet above the sea, and has snow lying on it for nine months in the year. The greatest elevations within six miles of the coast are Mount Carmo or Calvo, upon the west side of the Gulf of Genoa, 4,557 feet in height; Altissima, near Spezia, 5,213 feet; Petrella, near Gaeta, 5,034 feet; Vesuvius, 4,206 feet; Cocuzzo, near Belmonte (Calabria), 5,620 feet; and Monte Alto, near Reggio, 4,278 feet. The country round Naples and to the southward is a vast volcanic region, Vesuvius being the only active volcano on the mainland; there are, however, three others upon the islands at distances of from 180 to 130 miles, viz., Ætna in Sicily, and Stromboli and Vulcano in the Lipari group.

Considerable changes in the levels of the Italian coast are traceable as resulting from volcanic agency, and the shores have been greatly extended by accumulations of alluvial deposit, chiefly in the neighbourhood of the Tiber. Although generally low, the coast is bold and safe for navigation, as, except off Leghorn, the bay southward of Cape Linaro, and off Licosa Point, a depth of 5 fathoms will be found at 1 mile from the shore.

Ports.—The chief ports and anchorages are Savona, Genoa, Spezia, Leghorn, Civita Vecchia, Gaeta, Naples, and Taranto on the mainland, and Ferrajo in Elba. There are arsenals and naval depots at all these places except Savona, but there are large ironworks, where armor plates and steel rails are manufactured. The iron industry on the coast from Savona and Spezia has very much developed of late years and is now as preeminently the most important industry of the district as shipbuilding was in the days of wooden vessels some 45 years ago. At Leghorn there are large iron rolling mills.

Products.—The country is highly productive, abounding in much mineral wealth, especially iron and lead; there are numerous mineral and thermal springs, and the white marble quarries of Carrara are famous. The forests produce a variety of timber, including the chestnut, which affords also an important article of food; the vine, olive, orange, lemon, almond, fig, date, melon, and mulberry are very

extensively cultivated, the latter chiefly for the rearing of silk-worms. In the rivers and on the coast an abundance of fish are caught, the anchovy, sardine, and tunny fisheries employing in the season a large number of men. Sponges and coral are also produced.

Climate.—As regards climate, Italy may be divided into four regions—the northern, eastern, western, and southern. The first, coinciding with the valley of the Po, has a short, warm summer, and large daily ranges of temperature. Places situated on the Alpine slope have a mild winter relatively to their elevation and to those lying along the axis of the valley. Toward the Adriatic both the annual mean and the winter mean increase. Very low temperatures have been recorded at Padua, Milan, Turin, and Alessandria, and the annual range from the greatest heat at Milan (99.5°) to the greatest cold at Alessandria (0.1°) marks the climate as distinctly continental.

Central Italy is divided by the Apennines into two great parts, the eastern and western. The extremes of temperature diminish toward the south, and the temperature rises on both slopes toward the sea. On the eastern slope the mean annual temperature does not exceed 57° , and the absolute range is only 93° . In the western zone the annual mean is 57.7° and the range 91° .

Calabria, the Basilicata, Apulia, Sicily, and Sardinia form the last division, in which the annual mean varies from 61° to 64° , and the difference between summer and winter is only 25° . The higher mean in this zone is due to the greater warmth in January, February, March, November, and December, and therefore it does not appear that the summer heat increases in Italy toward the south. August is warmer than July in this southern region.

A comparison of recent records with those referring to the early years of the century shows that the climate has undergone no marked change.

In the Alpine region, particularly in the valley of the Po and the larger valleys of the Apennines in central Italy, there are two maximums and two minimums of nebulosity. The maximums occur in spring and autumn, that of autumn being the highest. The lowest minimum occurs in summer. The average number of clear days is above 150 in Venice, Pavia, and Ancona, and less than 120 in Turin, Moncalieri, Alessandria, Urbino, Leghorn, Siena, and Perugia.

In distribution of precipitation upper Italy differs from central, and still more from southern Italy. In the south there are two seasons, a wet and a dry, whereas north Italy has two maximums and two minimums, the rain falling abundantly and being accompanied by storms, especially in May and June. The Provinces of Udine and Belluno are especially rainy, the fall amounting to about 60 inches in the year. Genoa and the Province of Vicenza follow, while the Capi-

tanata, the Salentine Peninsula, and Sardinia are the driest parts of the kingdom. For the rest, the distribution of rain is so irregular that the amount received by adjacent places may differ considerably.

In summer Italy is not affected, directly or indirectly, by the cyclones of the Atlantic, and the numerous storms are due to local winds. In spring and autumn also, though the great cyclones pass from west to east at lower latitudes, they seldom impinge directly on Italy, but the danger from secondary disturbances is greater when anticyclones bar the passage of a cyclone to the east or when great barometrical depressions lie over the land or seas of Italy. The storms of winter sometimes, and these the most violent, pass southward from the British Isles, impinging on the Alps between Mont Blanc and the Maloja Pass; others descend from the Baltic; others, again, reach the western coast from the gulf of Gascony and Spain, while storms from the Strait of Gibraltar visit the southern parts of Italy.

Trade.—In 1914 there were 11,165 miles of railroads open and 32,652 miles of telegraph line. The chief imports were cotton, spirits, colors and dyeing materials, hemp, flax, jute, wool, silk (raw and manufactured), wood, hides, minerals, metals, stones, earth, coal, pottery, cereals, animals and their products, paper, books, carbonate of sodium, cheese, coffee, salt, gutta-percha, horses, leather, machinery, medicines, oils, nitrate of soda, nonoleaginous seeds, instruments, potash, sulphate of copper, chemical products, colonial produce, agricultural machinery, railway rolling stock, iron (scrap and pig), steel, petroleum, oleaginous seeds, salt fish, etc. The exports consisted of wine, olive oil, raw silk, acids, straw hats, paper, hemp, rice (refined), coral, cotton tissues, hides, cattle, agricultural products, minor cereals, fish, dried fruits, pigs, poultry, cheese, butter, eggs, minerals, marble, zinc ore, sulphur, glassware, artistic works, etc.

Corsica (ancient Cynros), belonging to France, is about 100 miles in length north-northeast and south-southwest, 45 miles in extreme breadth, of an irregular but somewhat oval figure, tapering to the northward and forming a promontory nearly 20 miles in length; the area of Corsica is 3,377 square miles, within a coast line of 338 miles. Its northern extremity is about 92 miles to the southeastward of Cape Martin, in France, and 45 miles from the coast of Italy eastward, the sea separating it from the Gulf of Genoa is known as the Gulf of Liguria. The southern extremity of Corsica is about 6 miles from Sardinia, from which island it is separated by the Strait of Bonifacio. The eastern coast of the island is formed for the most part of a fine alluvial plain, bordered near the beach by a line of stagnant waters, which are hotbeds of malaria in summer; the western shores are lofty (the mountains descending abruptly to the sea) and in-

dented, several extensive bays affording good roadsteads and secure harbors for coasting vessels.

A chain of granitic mountains traverse it from north to south, the highest summits of which are Monte Cinto 8,898 feet Monte Rotondo 8,626 feet, and Monte de Oro (the Mons Aureus of Ptolemy) 8,695 feet above the level of the sea, covered with snow nearly the whole year, and in clear weather seen from a distance of from 60 to 90 miles. The declivities of the central chain are steep, with numerous clefts and gorges; valleys are few, excepting in the lower hill ranges, and even there they are narrower. There are no navigable rivers; the principal streams are the Golo and Tavignano on the east, and the Taravo, and Tavarica or Valinco on the west. The east coast is bordered in many parts by low plains; rivers can only force their way through with difficulty, thus forming marshes and lagoons, which are hotbeds of malarial fever in summer, obliging the natives to migrate to the hills during that season.

A large extent of the country is covered with brushwood, but the forests are remarkably fine, and abound with timber of the best qualities, among which are the birch, oak, pine, ilex, cork, and chestnut. There are both chalybeate and sulphur springs, the waters from the former being largely exported. Game is abundant in some places and include wild duck, plover, partridges, quail, woodcock, and snipe; the red deer and wild sheep (mouflon) still exist in small numbers; trout are to be found in the streams and in the pools in the interior. There is a close season.

The chief branch of industry is the rearing of live stock, such as horses and goats. The corsican horse is small, hardy, willing, and swift. Owing to the absence of meadows the goat takes the place of the cow. Goat's milk, butter, and cheese are abundant. Much time is devoted to general agriculture. The products are timber, honey, olive oil, and fruits; fish are caught along the coast, but principally by Italians. Minerals of various kinds exist, including lead, silver, copper, and antimony, but with the exception of the antimony and copper mines near Bastia the others are not worked. There is an inexhaustible amount of granite, porphyry, serpentine, and marbles. Asbestos is produced, of excellent quality, coral is procured off the west coast and sponges off the east coast of the island. Coarse woollens, hardware, and leather are manufactured.

The principal articles of import to Corsica consist of spirits, coal, timber, glass and earthen ware, forage, building materials, hardware, potatoes, textiles, sugar, etc.; and of exports, wine, mineral water, timber, charcoal, antimony and copper ores, citrons, fruits, chestnuts, bark for tanning, gallic acid, cork, etc.

There are railroads into the interior from the towns of Bastia, Ajaccio, Calvi, and Ile Rousse; also along the east coast of the island

from Casamozza to Ghisonaccia, and the island roads are excellent. Telegraph cables are laid to Nice, Leghorn, and Toulon.

Mineral springs.—Corsica is exceptionally rich in mineral springs, the most important of these being at Orezza, whose waters are more impregnated with iron than any other similar spring in Europe. Pietrapola, with its hot sulphur springs, is an excellent place for rheumatic cases. Other very effective springs are Puzzi-chello, Guagno, Caldane, Guitera, Pardina, etc.

Climate.—The climate, which has the characteristic of being very uniform and clear, has many therapeutic qualities, being tonic and sedative.

There are three distinct climates in Corsica—

(a) That of the coast and plain, extending from the seashore to an altitude of 300 feet, which is a winter climate—hot like the parallel coasts of Italy and Spain.

(b) A mountain and sea air combined, from 300 to 1,800 feet; this is also a winter climate.

(c) A mountain climate, from 1,800 to 4,500 feet, which is a summer one.

In April and May the weather is pleasant, and this is the most pleasant time for traveling. In June, though the sun is hot, the air is agreeable and invigorating, but from the end of June to the end of September the island should be avoided on account of the malaria. The average annual rainfall is not more than 23 inches at Ajaccio. Long droughts prevail in summer.

Ports.—There are sixteen commercial ports, the most important being Bastia, followed by Ajaccio, Propriano, Bonifacio, Ile Rousse, Calvi, St. Florent, Centuri, Macinaggio, etc.

Population.—In 1911 the population numbered 288,820, including 12,000 foreigners, mostly Italians.

TUSCAN ARCHIPELAGO.

The Tuscan Archipelago belongs to the kingdom of Italy, and consists of eight islands and two groups of rocks, with deep and safe channels between them; they are situated between the north part of Corsica and the west coast of Italy. The group forms the figure of a parallelogram, the western side of which comprises the islands of Capraia, Pianosa and Monte Cristo, and the Africa Rock; the channel between them and Corsica is from 15 to 22 miles wide; the eastern side comprises the islands of Elba, Palmajola, Cerboli, Giglio and Giannutri, and the Formiche de Grosseto Rocks, all being 5 to 8 miles from the coast of Italy.

SARDINIA.

Sardinia (Ital. *Sardegna*) is the second largest island in the Mediterranean and second only in importance to Sicily; it is of

oblong form, extending for 147 miles in a north-northeast and south-southwest direction, with breadths varying from 55 to 80 miles. It lies southward of Corsica, with the Strait of Bonifacio $6\frac{1}{2}$ miles in width between and, with its adjacent islands, 108 miles in circuit, has a coast line of 726 miles and an area of 9,187 square miles.

The early history of Sardinia is entirely unknown. It was conquered by Carthage about 500–480 B. C. In 238 B. C. the island was handed over to the Romans and was governed by them in conjunction with Corsica. Little was heard of the island under the Roman Empire, except as a granary, and as remarkable for its unhealthiness and the audacity of its brigands. After the Romans, the island passed into the hands of the Vandals, and on the fall of the Vandal Kingdom in 534 it passed to the Byzantine Empire and remained nominally under Byzantium until the tenth century. From 720 to 1022 the island was frequently raided by the Saracens, but in the latter year they were finally driven out by the Pisans and Genoese, the island becoming Pisan. In 1326 the Pisans were driven out, and it became a province of Aragon. The island remained a Spanish province until the war of the Spanish succession, when in 1708 Cagliari capitulated to an English fleet, and the island became Austrian. In 1720 Sardinia passed to the Dukes of Savoy in exchange for Sicily, and in 1840 it was merged into the Kingdom of Italy, complete political union with Piedmont was granted, and the vice regal Government suppressed.

A large proportion of the surface is hilly or mountainous; the principal range runs north and south at no great distance from the east coast, but the land is of considerable elevation in other directions. The highest peak is Monte del Gennargentu, which, near the middle of the island, rises 6,130 feet above the level of the sea, while that of Limbara, to the north, is 4,330 feet; upon these the snow lies for six and seven months in the year.

There are several extensive and elevated plains, the principal being those of Ozieri and Sassari in the north, that watered by the Tirso, in the center, and the Campidano di San Gavido, between the Gulfs of Oristano and Cagliari, in the southeast.

The most considerable streams are the Tirso or Tirsi, and Bosa on the west; the Coghinas on the northwest; the Flumendosa on the southwest; and the Samassi or Mannu on the south; there are also numerous small streams. Around the coast are some lagoons, and several bays, as those of Cagliari and Palmas on the south; Oristano on the west; Asinara on the north; Sassari and Orosei on the east.

The northeast and southwest coasts are of very irregular outline, islands and rocks lying a short distance off, between which and the coast (especially on the northeast) are many excellent anchorages protected from all winds, and adapted for all classes of vessels.

It is divided into two provinces, Cagliari in the south and Sassari in the north, these being subdivided into nine districts, viz.: Cagliari Iglesias, Lanusei, Oristano, Sassari, Alghero, Nuoro, Ozieri, and Tempio, and is governed by a *prefetto*, who resides at Cagliari. Italian is the language of the educated class, but that generally spoken is *Sarde*, a mixture of Latin, Spanish, and Italian.

Geology.—The island is composed mainly of granite and other crystalline rocks; granite being estimated to cover half of the entire surface. In the western part of the island the crystalline rocks are principally porphyritic in structure; there are deposits of Silurian and Cretaceous times, but the sedimentary deposits are comparatively unimportant.

Minerals.—The southern portion of Sardinia is, as regards mineral wealth, the richest province of Italy; they are chiefly sulphates of lead, sulphates and silicates of zinc, iron pyrites, sulphates of iron and copper, of antimony, arsenic, besides cobalt, nickel, and silver.

Flora and fauna.—Many of the mountains were formerly covered, from base to summit, with dense forests of oaks, cork trees, chestnuts, beeches, larches, and pines, but these forests have been largely destroyed by the trees being burnt for charcoal and potash.

Among the wild animals, that known as the musimon, or European mufion, is the most interesting, and of noxious animals are the scorpion and the tarantula.

The lagoons, near the coast, abound in mullets, eels, mussels, and crabs, and the sea fish are the tunny, anchovy, and the sardine.

Population.—In 1914 the population was 870,077.

Products.—The most fertile plains are in the southern part of the island, and produce wheat, barley, beans, etc., large quantities of the first named being grown.

Palms and groves of olive trees are found in the forest. Vines, orange, lemon, citron, fig, pomegranate, and the ordinary fruit trees of Europe, are abundant, and are found side by side with those of North Africa; flax, linseed, hemp, and barilla are grown.

The production of wine is very large, the manufacture of tobacco has considerably developed, and salt is produced in great quantity.

Tunny and coral fishing are also carried out.

Trade.—The exports, principally consisting of minerals and manufactures of metals, wines, live animals and animal produce, hides and furriery, cereals and vegetable products, spirits, tobacco and oils. The imports, cereals, groceries, cotton, etc.

Ports.—The principal ports are Cagliari, on the south coast, Porto Torres and Forte on the west coast. Terranova on the east coast, and Maddalena on the north coast.

Communication—Steamers.—By the steamers of the Navigazione Générale Italiana there is daily communication (often in-

interrupted in bad weather) with Civita Vecchia from Golfo degli Aranci; there is weekly communication with Leghorn, Genoa, Naples, Palermo, and Tunis, and with Porto Torres, calling at the intermediate ports of the island. There is also a weekly French service between Porto Torres and Ajaccio, in Corsica.

Railroads.—The main line of railroad is from Cagliari northward to Aranci, a distance of 190½ miles, and at Decimo-Mannu, 10 miles from Cagliari, a branch runs to Iglesias and Porto Vesme on the southwest coast; further north on the main line, at San Gavino, a mineral railway runs to Monte Vecchio. At Macomer, 96 miles from Cagliari, branch lines run to Bosa on the west coast, and to the eastward to Nuoro. Alghero and Porto Torres, on the west coast, are connected with Sassari, and thence join the main line at Chilivani, and at Monti, 28 miles from Aranci, there is a short branch line to Tempio.

Cagliari has also railroad communication, by narrow gauge, with Tortoli on the east coast, and on this line there is a branch at Mandas to Sorgono, almost in the center of the island.

Telegraph.—Two submarine telegraph cables, connected by land wire with Terranova, are laid between the northeast coast of Sardinia and the west coast of Italy.

Radio.—Radio stations have been established at Capo Sperone and at Isola Chiesa (Maddalena), which are always open; and one at Castiadas, which is open to the general public from sunrise to sunset.

Submarine vessels—Caution.—Mariners are cautioned that exercises with submarines are being carried out daily in the approaches to Maddalena, at Baia degli Aranci, and in adjacent areas.

Time.—Mid-European time, or one hour fast of Greenwich mean time, is kept.

Money—Measures—Weights.—See Sicily, page 31.

Climate.—The climate is similar to that of the rest of the Mediterranean region; autumn, prolonged into December, is the most agreeable season, and winter is rainy. The intemperie, which differs from the malaria of Italy, is being pernicious at all times wherever it abounds, attacks even strangers landing for a few hours, and the cool air of evening or night should be especially avoided by them.

The natives also avoid the extreme heat of the day on account of sunstroke, and attribute its frequency and fatal effects to the malignity of the intemperie, to the sun becoming suddenly overcast, or to moving abruptly from the sunshine to the shade.

Inhabitants, who can afford residences on high ground, remove to them in June when the air begins to become unsafe, although it is not dangerous until August; those remaining on the lower ground keep well clad in woollens, avoid exposure to the sun or to summer

showers and exertion, and adopt a spare diet. A severe headache, brought on by evening dew, is supposed to be a forerunner of intemperie.

SICILY.

Sicily, the most important island of the Mediterranean, is triangular in form (hence its ancient name *Trinacria*), the northern or longest side being about 150, the southern 140, the eastern 100 miles in length, and the whole area is about 10,000 square miles; it is separated from the mainland of Italy by the narrow Strait of Messina.

The greater part of Sicily is mountainous; the average distance of the summits of the mountain ranges from the coast is about 10 miles. There are, however, isolated elevations, the most remarkable being that of the volcanic mountain of *Ætna* upon the east, 10,880 feet above the level of the sea. An extensive plain lying southward of *Ætna* is 20 miles in length in a westerly direction from Catania Bay, and about 7 in breadth.

The shores are not deeply indented, and there are few off-lying features except the *Ægæan Islands* off the western point.

It is divided into seven provinces, viz, *Caltanissetta*, *Catania*, *Girgenti*, *Messina*, *Palermo*, *Syracuse*, and *Trapani*, each governed by a prefect.

History.—The geographical position of Sicily led almost as a matter of necessity to its historical position, as the meeting-place of the nations, the battlefield of contending races and creeds. For this reason, too, Sicily was never in historic times (nor, it seems, in prehistoric times either) the land of a single nation; her history exists mainly in its relation to the history of other lands.

The Phœnician occupation came about 900 B. C.; the Greeks commenced to arrive about 100 years later, and gradually drove the Phœnicians into three considerable towns on the northwest corner of the island. From now on to 392 B. C. the fighting was constant between Greeks and Phœnicians. In 241 B. C., at the end of the first Punic war, Carthage ceded to Rome all her possessions in Sicily, and Sicily remained Roman until about 429, when it belonged variously to Teutonic powers, Vandals, and Goths, but was won back to the Roman Empire in 550, and remained so until 960. In the ninth, tenth, and eleventh centuries Sicily was once more the scene of the old drama with the strife for life and death between Christendom and Islam. The Saracen invasion began about 655, and in 965 they had conquered the whole island, and remained in possession until the Norman Conquest in 1060. The island remained under Norman rule until 1302, when it became an independent power.

Sicily became once more united to Naples in 1443, and both countries remained under Spanish rule until 1720, when Sicily was sur-

rendered to Austria. In 1733 the island was conquered by the Bourbons, and remained under their sovereignty, except for 1806–1815, when Napoleon made his brother king, until the successful revolution in 1860 under Garibaldi. On February 18, 1861, the first Italian Parliament met, and Sicily became incorporated in the United Italian Kingdom.

Rivers—Lakes.—The rivers are small, and there are none navigable except for boats; the principal are the Fiume Grande on the north, the Fiume Simeto and Alcantera on the east, the Salso, considered the largest on the island, the Platani and Belici flowing toward the south. The chief of the lakes, of which there are but few, is the Biveri or Lentini, which lies a little southward of the plain of Catania.

Geology.—Of the sedimentary rocks, none are earlier than the secondary period. The mountain range, from 3,000 to 6,000 feet above the level of the sea, consists of granite flanked with limestone and other calcareous formations.

Quaternary deposits border many of the bays, and the plain of Catania is wholly covered with recent alluvium; basalts and basaltic tufas border this plain on the south, as the ancient and modern lavas of Ætna do on the north.

Flora and fauna.—The flora is remarkable for its wealth of species, the orders most represented being *compositæ*, *cruciferae*, *labiatæ*, *caryophyllaceæ*, and *scrophulariacæ*; the *rosaceæ* are also abundantly represented, and amongst them are numerous species of the rose.

There are fine forests of timber, especially around Ætna, on the sides of which the oak and chestnut thrive at 4,000 feet, and the beech at 6,000 feet above the level of the sea; amongst trees and shrubs is the sumach, the manna ash (*Fraxinus ornus*), the prickly pear, the agave, the date palm, the plantain, the dwarf palm, and various bamboos and cycads. The *Arundo Donax*, the tallest of European grasses, is indigenous.

The native fauna of Sicily is similar to that of southern Italy: tunny and sardines abound, and the rivers and lakes produce an abundance of fish.

Population.—By the last census, in 1914, the population of Sicily, including the islands, was 3,743,447, or about one-tenth of the population of the whole of Italy.

Products.—From its soil and climate Sicily is one of the most productive islands of the world; vines and fruit trees are extensively cultivated, and the production of wine is about 100,000,000 gallons a year; the other products are olive oil, green fruit, citrus fruits, Indian corn, sumach, and beans.

The chief mineral production is sulphur ore, obtained in the center of the island and toward the southern coast; the other mining productions are rock salt and asphalt rock.

Trade.—The principal exports are wines, citrus fruits, green and dry fruit, sulphur, rock asphalt, olive oil, silk, and sumach; imports, petroleum, timber, grain, hides and skins, iron and metals, colors and dyes, flour and staves, and coal.

Ports.—On the north coast are the artificial harbors of Milazzo, Termini Imerese, and Palermo; the east side of the island affords several safe harbors, viz, Messina, Catania (artificial), Augusta, and Syracuse; the south coast has two artificial harbors, named Empedocle and Licata, and, on the west coast, are the two artificial harbors of Trapani and Marsala.

Communications—Steamers.—The following lines afford communication:

The State railroad has a steamer service from Palermo to Naples and back daily; from Naples to Messina, Reggio, Riposto, Catania, Syracuse and back twice a week.

A regular service of steamers of the Wilson Line between Hull and Palermo, and of the General Steam Navigation Co. between that port and London.

Navigazione Générale Italiana: From Palermo to Ustica, twice every week; to Cagliari, weekly; to Messina, Catania, the Levant, Constantinople, and Black Sea ports, weekly; to Trapani and Tunis, weekly. From Catania to Syracus, Malta, and Libia (Tripoli), weekly; and a monthly service between Venice, and intermediate Italian ports and Calcutta, calling at Catania.

Adria Line: Syracuse to Malta, daily (Sundays excepted), and to Syracuse, Malta, and Libia (Tripoli), weekly.

Railroads.—The main lines of Sicily are between Palermo and Messina, Palermo and Catania, and Messina and Syracuse. In 1913 there were 793 miles of broad gauge and 46 of narrow gauge railroads in Sicily. From Palermo the railroad runs near the coast to Messina, with stations at Bagheira, Termini Imerese, Porto Cefalu, San Stefano di Camastra, Sant' Agata di Militello, Naso, Patti, Barcellona, and Milazzo.

There is a train ferry service across the Straits of Messina, distance about 14½ miles.

The Catania and Palermo railroad joins the line between Palermo and Messina at Termini Imerese.

Between Messina and Syracuse there are stations on or near the coast at Scaletta, Giardini-Taormina, Giarre-Riposto, Acireale, Catania, Valsovoja, Lentini, Augusta, and Priolo.

From Syracuse the line is still near the coast, with stations at Avola, Noto, and Pozallo; here it turns to the westward, with stations at Vittoria, Terranova, and Licata, which latter place and Empedocle are both connected by railways with the Catania and Palermo Railways.

From Trapani a line runs to the southward, with stations on or near the coast at Marsala, Mazzara, Campobello, and Castelvetro; it then curves round to the northward to Castellamare, and is again near the coast to Palermo, with stations at Partinico, Carini, and Tommaso Natale.

Narrow gauge railroads run from Castelvetro to Selinunte and Partanna; and from Palermo inland to Corleone.

A railroad from Catania circles round Mount *Ætna* to Riposto, a distance of 71 miles.

Telegraph.—There are submarine cables across the Strait of Messina, a cable to Malta, one to Pantellaria, one to Ustica, one to Naples, and one to the Lipari Islands.

Radio.—Radio stations have been established at Vittoria, near Scoglitti, which is always open to the public; and at Sferracavallo, near Palermo, open to the public from sunrise to sunset.

Time.—Mid-European time, or one hour fast of Greenwich mean time, is kept.

Money—Measures—Weights.—Gold coins are very scarce, the currency consisting chiefly of notes, silver, bronze, and nickel coins; the current coins are those of the Italian Kingdom.

100 centesimi=1 lira=specie, 9½d.=paper, 8⅛d.

Gold coins.—100, 50, 20, 10, and 5 lire.

Silver coins.—5, 2, and 1 lira.

Nickel coins.—20 and 10 centesimi.

Bronze coins.—10, 5, 2, and 1 centesimi.

The 5-centesimi piece is named a soldo, and prices are sometimes quoted in soldi.

The measures and weights are those of the metric system, as in France.

Climate.—The climate of Sicily resembles that of southern Europe, but the chief annoyance is the scirocco, which, experienced in its most characteristic form on the north coast, occurs frequently in April, in May, and September, but no month is actually free from it. There is a rainy and a dry season, the former commencing with thunderstorms in September and October, sets in steadily in November, but somewhat abates in February, and ends about the close of April: there is scarcely any rain in the dry season; continuous rain at any time is rare, but the heaviest fall is in December.

LIPARI ISLANDS.

Lipari Islands.—These islands, forming a group off the north coast of Sicily, are the *Insulæ Æoliæ* of the ancients (from being the supposed residence of Æolus), and were also known as *Hephæstides* or *Vulcaniæ Insulæ*. Here, according to fable, Æolus held the winds imprisoned in caverns, and released them at his pleasure, and Vulcan forged the bolts of Jove.

The chief island was colonized in the sixth century, B. C., and they successively passed into the hands of the Athenians, Carthaginians, Romans, Saracens, and Normans, and finally Ferdinand the Catholic annexed them to Sicily.

The group consists of seven principal islands, viz., Stromboli, Panaria, Salina, Lipari, Vulcano, Filicudi, and Alicudi, with several islets and rocks. They are all irregular in outline, and comprise with Ustica a coast line of 77 miles; they are mountainous and all of evident volcanic origin, with distinct craters on several, two of which are active.

The western coasts of all the Lipari islands are steep and craggy, rising abruptly in precipitous masses, and shelving down gradually to the eastward; some of them have a high isolated rock off their northern shores, a singularity extending even to Ustica.

They are governed by a delegate, subject to the prefect of Messina.

Geology.—Mountainous in character, the islands consist of tuffs and lavas, and of highly silicious volcanic products, such as quartz-trachyte, pumice, and obsidian. There are hot springs on the main island, and one at San Calogero has a temperature at 198° F.

Products.—Cattle are scarce and lean, as the pasturage is suitable only for goats; but the land is well cultivated, and yields grapes, currants, figs, prickly pears, corn, cotton, olives, and pulse, the latter grown under the cane trellises that support the vines.

Rain, if violent, occasions great damage to the ground, from the situation and friability of the soil, and swarms of locusts sometimes injure the produce severely.

Trade.—A considerable quantity of wine and currants is exported, and an active trade carried on in bitumen, pumice, niter, pozzolana, cinnabar, coral, and fish; but alum, once a great staple, scarcely exists as an article of commerce, a failure supposed to be owing to the decreased heat of the subterranean fires. Sulphur is still exported, but not in the quantity it might be, in consequence of a prejudice existing that the vapor arising from the purifying of it infects the air and injures vegetation.

Ports.—The anchorages around the islands are principally suitable for small vessels.

Communications—Steamers.—There is communication daily between Milazzo, Lipari, and Salina, twice a week between Messina.

Lipari, and Stromboli, and fortnightly between Messina, Lipari, Filicudi, and Alicudi, by steamers of the Società Siciliana di Navigazione. A steamer of the Navigazione Générale Italiana runs between Palermo and Ustica twice every week.

Telegraph.—There is a submarine telegraph cable from Ustica to Palermo; also a cable from Milazzo to Lipari, from which there are cables to Salina, to Panaria, and to Vulcano.

Climate.—The climate is highly salubrious, and the weather generally soft and refreshing; but, though there are a few small springs, there is a general scarcity of water, as the soil, consisting entirely of scoriæ, tuff, pumice, pozzolana, and ashes, without any intervening stony stratum (except occasional masses of obdurate vitrification) rapidly absorbs the moisture; the natives are, consequently, obliged to construct spacious cisterns, wherein rain water is kept with a cool temperature.

MALTESE ISLANDS.

Maltese Islands.—This group, consisting of three islands—Malta, Gozo, and Comino, lies on the submarine ridge which separates the eastern from the western basin of the Mediterranean, at about 58 miles from Sicily, and 180 miles from the African coast. The islands extend 24 miles in a northwesterly and southeasterly direction, and cover an area of 115 square miles.

The group was originally under the dominion of the Carthaginians, from whom they were taken in the first Punic war by the Romans; on the decline of the Roman Empire Malta fell to the Goths, and then to the Saracens. It was subject to the crown of Sicily from 1190 to 1525, when the Emperor Charles V granted it to the Order of the Knights of St. John of Jerusalem, by whom it was held for more than two centuries.

On July 12, 1798, Malta capitulated to Napoleon Bonaparte. It was taken possession of by Great Britain on September 5, 1800, and finally annexed to the British Crown by the treaty of Paris in 1814.

Occupying a central position in the Mediterranean, and being in the direct route to the Levant and to India and Australia, via the Suez Canal, these islands are a most important port of call for the many vessels passing.

The government is administered by a governor, usually a distinguished general, assisted by an executive and a legislative council, the latter known as the council of government.

Geology.—The geological formation is of the late Tocene, the prevailing rocks being white, gray, reddish, or yellow sandstone, with some beds of marl and coral limestone, in many parts abounding in fossils.

Flora and fauna.—The interesting flora of the islands approaches that of Africa, and includes the palm, the cactus, and other

subtropical plants. The botanic garden, founded in 1676, and the third oldest in the British Empire, is annexed to the university; there is also a model farm.

The scanty fauna is, for the most part, European; a few Maltese dogs still remain, but not in a wild state.

There are some 10 or 12 indigenous species of birds, and a large number of migratory birds pass, or rest, on, the island; the marine plants and animals are interesting.

Population.—The civil population of the islands in 1914 was 219,311.

Products.—The chief products are cotton, corn, oranges, melons, grapes, cumin seed, and early potatoes for the London market; figs and honey are plentiful.

The greater part of the soil was originally brought from Sicily; the acreage under crop, or on which fruit trees are grown, is estimated at 38,545 acres, or rather more than half the extent of the island. The lace industry affords employment to between 4,000 and 5,000 women and children, chiefly in Gozo.

Trade.—The chief exports are potatoes, onions, cumin seed, vegetables, oranges, cotton goods of local manufacture, Maltese canes, goats, and freestone.

Ports.—The Grand Harbor is the principal port of Malta, and Marsa Musciet is known as the Quarantine Harbor; there are also several bays and well-sheltered harbors around the islands.

Submarine vessels—Caution.—Submarine vessels are being constantly exercised in the vicinity of Malta.

In order to minimize the risk of collision with other vessels, the vessel escorting the submarines will, when the latter are exercising, display a large red flag at the masthead.

Every vessel seeing this signal should steer so as to give the escorting vessel a berth of at least 1 mile, and also to pass astern of her; when from any cause this can not be done, the escorting vessel should be approached at a slow speed until warning is given by flags, semaphore, or megaphone, as most convenient, of the danger zone, a good lookout being kept meanwhile for the submarines, whose presence may only be indicated by their periscopes showing above water.

Signal.—When submarine vessels are under way in the harbor, or within 1 mile of the entrance, letter S flag is hoisted at the Castille, palace tower, and customhouse.

Communications—Steamers.—The following are the principal steamship companies whose vessels call at Malta:

Peninsular and Oriental: To Gibraltar and London or to Port Said, fortnightly.

Moss line: To Gibraltar and Liverpool or to Alexandria, fortnightly; and to Constantinople and the Black Sea ports, monthly.

Adria line: To Syracuse daily (Mondays excepted); to Italian ports and Fiume, weekly; to Italian, French, and Spanish ports, weekly.

Navigazione Générale Italiana.—To Sicilian ports, Naples and Genoa, weekly; to Tripoli and ports of Tunis, weekly; and to Tripoli and its ports, weekly.

Compagnie Générale Transatlantique: To Tunis and Marseille, weekly.

Hamburg-American line: To the United States

Ligne Hambourgeoise du Levant: To Hamburg, Havre, Pireus, Smyrna, and Constantinople.

There is also steamer communication with Gozo, two services daily each way.

Railroad.—There is a railroad from Valletta to Notabile, a distance of 8 miles.

Telegraph.—Four submarine cables connect Malta to Gibraltar, two to Bona, one to Tripoli, one to Sicily, one to Zante, and three to Alexandria; there is consequently telegraphic communication with all parts.

The inland telegraph system belong to the military authorities, and there is a military telephone to Gozo.

Time.—Mid-European mean time, or one hour fast of Greenwich mean time, is kept.

Money—Measures—Weights.—British money is the legal currency of the islands, but there is also a special bronze coin named a grano, which is equal to one-third of a farthing or 0.1d.

British imperial measures and weights are the only legal ones in use.

Climate.—The climate is excellent in winter, with bright sun and blue sky, the mean minimum monthly temperature in January, February, and March, being about 52° F. In these months, gales from northeast, locally named gregales, occasionally occur. The summer in Malta is hot and relaxing, and the islands then well deserve the title conferred on them by Lord Byron, "A military hothouse." September and October is the season of southeast winds, named locally scirocco, during the prevalence of which it is useless to paint a vessel, to bottle wine, or to attempt to keep meat; it is then an unhealthy wind, laden with moisture, and produces lassitude and dyspepsia. Southeast winds also occur at other times of the year, but they are not then so oppressive.

The death rate of the civil population in 1910 was 21.42 per mille.

Mediterranean fever has shown a considerable decrease among the civil population, and has practically ceased altogether in the fleet and garrison.

WINDS AND WEATHER.

Gulf of Lyons.—The winds in this gulf are very variable and uncertain, but as a general rule westerly winds predominate from May to September; easterly from October to January. A great peculiarity noticed in the Gulf of Lyons is the sudden rising of the waves, and their attaining a size not at all proportionate to the strength of the wind.

The northwest wind, named the mistral, is the most frequent throughout the year, and during the winter and spring often blows with great violence, sometimes lasting three and even nine days; blowing hardest at midday and moderating toward evening. In summer northwest winds though sometimes strong, are not often violent and the weather is usually fine and clear; at this season and particularly in August on the coast of Provence, the wind moderates toward noon, freshens again at from 2h. to 3h. p. m. and falls at sunset; should the wind continue after sunset it will probably blow harder the next day. Northwest winds are generally stronger after showers than after heavy rain.

Northerly winds often blow in the winter, and although sometimes strong are usually accompanied by fine weather; the barometer is high, the sky clear, and the air cold.

Winds from north to north-northeast named orsure, are sometimes extremely violent, but are fortunately of rare occurrence. They are accompanied by stormy weather, and while they last render the coast unapproachable to a sailing vessel.

Easterly winds in the summer are usually light during the day, falling in the evening, and the weather is fine. An east wind in the middle of the gulf veers to southeast on the coast of Catalonia and to northeast on the shores of Provence, both in winter and summer. In the winter easterly winds are always rainy on the coast of Provence, and if they shift to the southeast are accompanied by somber, dismal weather: southeast winds at this season are dangerous, and on the first indication of their approach shelter should be sought for as quickly as possible, for the land becomes quickly obscured. The southeast winds are the most dangerous, if when coming from the westward, southwest winds with thick weather have been experienced on the coast of Catalonia.

Southwest winds occasionally blow in the gulf. In the summer they are generally light, hauling to southeast and east, with fine weather as the eastern side of the gulf is approached. In winter the southwest wind seldom blows hard, but if it does the weather is bad, and the coast of Provence becomes very dangerous on account of the heavy sea thrown in by this wind and from the land being entirely obscured.

Gales.—The Gulf of Lyons is notorious for its bad weather, and the northwest gales are greatly dreaded during the winter; sometimes at this season the weather is fine and dry and the sky clear, and the wind hauls to the northward on approaching the coast of Provence. Usually, however, the sky is covered with clouds, heavy rain falls and occasionally snow, accompanied with violent squalls.

As a general rule gales from northwest to southeast veering by north in the gulf, are gales from northeast on the coast of Catalonia.

Gales from southeast to west, veering by south in the gulf are generally southwest on the coast of Catalonia. Gales from the southwest often back to the southward in the middle of the gulf, and to southeast and east on the coast of Provence.

With gales from southeast or southwest too great precaution can not be taken; forcing the waters into the gulf, they cause a very heavy sea and blow furiously in the squalls which accompany them.

Northwest gales on the coast of Provence during the winter usually commence at north-northwest and back to the westward; if they back to southwest the sea becomes very heavy, the weather thick and rain falls in torrents. It sometimes happens at this season, especially when the mountains are covered with snow, that the wind though strong in the gulf does not approach the coast, where at the same time light breezes from northwest to northeast will be found. Under these circumstances though the sky may be clear, the horizon has heavy clouds hanging round it, which, as a rule, denotes that there is bad weather seaward. Sudden shifts of wind from east to west are common, particularly in the middle of the gulf in bad weather.

Prognostics of northwest gales.—If after overcast rainy weather at the entrance of the Gulf of Lyons, the horizon to the northward is observed to clear, while clouds rise rapidly and are dispersed or broken at the zenith, there is every probability of a violent gale. The wind rises very quickly, and in a short time blows furiously; a heavy sea rapidly gets up and the weather is frequently so bad as to leave no alternative but to run for shelter under the lee of the Island of Sardinia.

Sometimes these gales spring up in the midst of a perfect calm and when the weather is clear; at these times the atmosphere becomes very clear and transparent, the land can be seen at a great distance, and the sea is like oil.

If the barometer under these circumstances falls suddenly, a northwest gale is approaching.

When a breeze springs up in the afternoon and freshens as the sun goes down, it may be expected to blow strong at midnight; hard gales are sometimes preceded by a heavy swell and surf.

Coast of Provence.—The months of December, January, February, and March are the bad seasons of this coast. Westerly winds are most frequent from May to September, easterly from October to January, but especially in October.

From March to September land and sea breezes are frequent on this coast, but only in the day; they commence before sunrise light from northeast to east-northeast, veering to the southward and increasing in strength. At noon the wind is from south to south-southwest, hauling to the westward in the afternoon, and falling at sunset. Fresh breezes from the westward often at this season succeed the light morning breeze from the northeast; seaward they are fresh, but near the coast they decrease at sunset; if they continue after, the wind will be very fresh the next day.

Opposing winds (*contrastes*) are often met with on this coast, especially near Cape Sicie; a strong northwest wind will blow on the west side of the cape, while at the same time it is from the eastward in the Bay of Toulon and among the Hyères Islands.

Thunderstorms are of frequent occurrence in the Gulf of Lyons, including the coast of Provence, during September and October; on the latter coast also in March, and sometimes in April and May.

Gulf of Genoa.—The coasts forming this gulf are more favored than those to the westward; it is rare that the weather is bad there, even in winter, more especially between Nice and Genoa.

In spring, on the coast of Genoa, where the land is high, the weather is fine, but the winds off the land are very strong, with heavy gusts from the ravines.

Winds from northwest blow sometimes during the day with great violence on the western coast of the gulf, but they rarely continue after sunset, particularly to the eastward of Bordighera, where it is nearly always calm while the wind is blowing to the westward. These are the winds that the inhabitants of the city of Nice and the adjoining coast dread so much from the piercing cold that accompanies them.

As the gulf is surrounded by high mountains, the wind off the land is occasionally very violent in the winter at the head of the gulf, the weather is overcast and rainy, and the squalls are very severe. These winds are from north-northeast in the middle of the gulf, northeast at Cape Mele, east on the eastern coast of Provence, and northwest on the coast of Tuscany and the Island of Elba.

Winds from southwest to southeast rarely penetrate with their full force into the head of the gulf, particularly during winter, when there is snow on the mountains; the southwest wind is loaded with moisture and raises the level of the water on the coast; it also sends in a heavy sea. A southwest wind has, however, been known to blow with violence at Genoa and Leghorn, causing great damage, but this is the exception.

West coast of Italy.—This coast is greatly sheltered by the islands of Corsica and Sardinia; in the space between, the weather is generally fine with light variable breezes from northeast to east and southeast, while on the coast land and sea breezes prevail.

Westerly winds are seldom felt, except when a gale is blowing from northwest, west, or southwest to the westward of the islands; these winds are then felt as squalls on the coast, particularly to the southward of Sardinia, but they are rarely felt at Naples. In general when there is a westerly wind blowing, with fine weather to the westward of the islands, the wind to the eastward of them is southeast.

During the winter and early part of spring southeast gales are not unfrequent, especially on the northern part of the coast from Civita Vecchia to Leghorn, but at Naples they are seldom felt. These winds commence with gloomy drizzling weather, and as the wind freshens it becomes very thick, with heavy rain; the weather clears as the wind hauls to the southward and westward, but it often flies to the westward in a violent squall. After blowing hard from this quarter for several hours it usually hauls gradually to the northwest and moderates, but should it back to southward of west the southeast gale will return. These gales are very disagreeable at Leghorn and send a heavy sea into the harbor.

When a southwest wind passes to the eastward of the islands, it throws a heavy sea on the coast, while the weather is very bad and overcast, with continual rain; fortunately these winds are of short duration and usually fall during the night.

Land squalls, named *raggiature*, often descend with great strength from the ravines and valleys situated amongst the high land, but they extend only a short distance from the shore. In the Gulf of Gioja these squalls will sometimes be blowing while there is a southwest breeze in the offing.

Corsica—West coast.—Westerly winds are frequent on the west coast of this island, and in the summer land and sea breezes are prevalent; the former extends only a short distance from the land; the latter commences about 10 a. m. and often blows fresh.

In winter, westerly winds blow hard on the western coast, throwing in a heavy sea, but these winds generally moderate toward night near the shore, and it sometimes falls calm in the deep bays, leaving a heavy swell. The weather is often fine at this season with northwest winds, and when the snow is on the mountains.

East coast.—Westerly winds do not often occur on the eastern coast of Corsica; generally when it is blowing hard from west or southwest on the western side, the wind is light from the eastward and southeast on the eastern shore. On the whole of this coast the winds are very variable.

Southeast winds frequently blow on the eastern coast during summer, bringing with them a close and oppressive atmosphere. East to northeast winds send a heavy sea into the anchorages on this side of the island; the approach of these winds is indicated by a heavy swell rolling in from the eastward.

Thunderstorms are frequent at Corsica during the months of July, August, September, and October.

Sardinia Channel.—In the channel between the south coast of Sardinia and the coast of Africa, the predominant winds, during the summer, are from east, east-northeast, and sometimes northeast, occasionally alternating with winds from east-southeast, but seldom shifting to the southeast excepting near the land during the night. These winds are generally moderate, following the trend of the coast near the land; and bringing up a thick mist which becomes very dense if the wind freshens, rendering it difficult to distinguish the land except from a very short distance. When the easterly winds blow fresh, the sky becomes overcast, the weather gloomy, and dew falls heavily.

Near the African coast at this season the wind falls at sunset, shifting to the southward and becoming a land breeze. In summer westerly winds sometimes blow, altering during the night to southwest; they are preceded by a cessation of dew, and when they are moderate the weather is clear; if the westerly wind lasts it is generally fresh during the day, moderating at night; if, however, it has set in with squalls and rain, it generally shifts again to the eastward as suddenly as it came.

During the winter (October to April) the prevailing winds are from the westward between northwest and southwest; they are strong during the early part of winter and are usually accompanied by rain; but in February, March, and April they moderate. If, however, the westerly wind alters to the north (especially to the westward of Sardinia), it generally blows hard from that quarter, a very heavy sea being one of the results. Winds from the south are rare and of short duration.

Fog.—The commanding officer of the British naval vessel *Alexandria*, 1887, states that caution is necessary in approaching the coast of Sardinia should the lights be obscured, as, although it may appear clear at sea, and apparently the land could be seen some miles distant, the fact that the lights can not be seen indicates that there is a thick mist over the land, so that it is impossible to see it even at a distance of 200 or 400 yards. This is much more dangerous than ordinary fog, as the weather is clear at sea.

Fogs are said to occur frequently in the early morning in Bonifacio Strait in the month of May.

Sicily Channel.—In the Channel of Sicily, between Sicily and the coast of Africa, the winds in the summer are the same as those experienced farther westward; with this difference only, that they shift to southeast and sometimes south, the atmosphere being very moist; the wind from this quarter is known as the “scirocco.” Winds from the westward at this season incline to the northwest, and are accompanied by fine weather.

In the winter, northeast and northwest winds prevail, and sometimes blow very hard; with the former the sky is overcast and rains are frequent, the wind often shifting to the southeast and blowing hard for several days. Northwest winds often shift to the west and southwest, when they bring bad weather.

With winds from west, round by north to north-northeast, the weather is generally clear. Calms are frequent, and about the time of the equinoxes alternate with squalls and thunderstorms.

Sicily.—In September the winds blow alternately from northeast and southwest, from October to March southwest winds prevail. In April, like September. From May to August the winds are chiefly from the northeast. The most experienced pilots say that storms which commence in the daytime are more violent and of longer duration than those which spring up during the night.

The scirocco is among the few drawbacks to the climate of Sicily. This wind, which comes from the deserts of Africa, is moderated by its passage over the sea to a tolerable degree of temperature; and on the east coast, where it first arrives, its effects are inconsiderable, but seeming to acquire additional heat in its progress over the land, becomes a serious inconvenience as it advances.

At its commencement the air is dense and heavy, with long white clouds settling a little below the summits of the mountains, and at sea floating just above the horizon in a direction parallel to it; the highest range of the thermometer is from 90° to 95°, but the feelings indicate a much higher temperature, the humidity increases, and the barometer falls to about 29.60.

The scirocco often continues three or four days, and although blighting in its general effects in summer, in winter it is favorable to some vegetation. This wind is particularly felt at Palermo, the streets become nearly deserted, and the doors and windows are closed to exclude it; in spring and autumn it is more frequent than in summer, and in winter is no longer disagreeable.

Malta Channel.—In the Malta Channel, winds from east to southeast are most prevalent during the summer, the latter sometimes shifting to the southward (scirocco), the atmosphere becoming thick and humid, and being accompanied by lighting. Calms are frequent.

In the winter the same winds are experienced northwest and northeast as prevail further westward; they are, however, as a rule,

stronger, and often freshen to a gale; with winds from northeast to southeast the sky becomes overcast, and it rains heavily, but with westerly winds the weather is clear.

Gales from northwest and northeast are frequent in these channels during the winter, and often blow with great violence; a gale from the latter quarter is termed a Gregale, and is especially destructive in the vicinity of the Maltese Islands.

Malta.—From December to March the winds occasionally blow with great force, the sky being clouded, with an abundance of rain, the Gregale, or northeast, wind, being especially destructive from its violence. In March the weather is more settled and dry, but in April and May there are occasional showers.

In June the heat is considerable, and continues to increase during the summer, the winds being light and mostly from the northeast and northwest. In September the sky begins to be obstructed by clouds; toward the evening the atmosphere is charged with electricity, which produces frequent lightning, often attended with heavy thunder.

The scirocco or south and southeast winds occur with great suddenness, chiefly in September, October, and November. They are so laden with humidity and so hot as to render the climate almost insupportable. These winds never blow long at a time, seldom lasting more than three or four days; they are frequently succeeded by a calm, during which the heat is very great but much less oppressive, though the thermometer frequently shows a much higher degree of real heat.

LOCAL NAMES FOR VARIOUS WINDS IN THE MEDITERRANEAN.

NORTH.—Tramontana (from the mountains); and Gli Secchi, or day winds, by the Italians; when from north to northeast they are called osure by the fishermen in the Gulf of Lyons.

NORTHEAST.—The Gregale of the Italians and Maltese.

EAST.—Solano and Levanter of the Straits. Levante; Bentu de Sole; and when light, Chocolatero by the Italians.

SOUTHEAST.—Scirocco, the hot, debilitating wind of South Italy and Africa; Maledetto Levante; Molezzo, the damp wind; and in the Adriatic when strong, Furiante.

SOUTH.—Mezzo Giorno (midday); from south to southwest Si-moom, Shume, or Siume, on the African coast, from off the Sahara desert.

SOUTHWEST.—Vendavales; also Lebeches, and Virazones, by the Spanish. Libeccio (Libyan or African); when gusty, Labeschades; and when very stormy, accompanied by lightning, rain, etc., it is called Ouragans by the Italians. Labbetch, in Algeria; and Siffanto in the Adriatic. It is the hottest wind in the summer at Malta.

WEST.—It is called in the Straits the *Liberator*. Ponente by the Italians.

NORTHWEST.—The *Mistral*, *Mistrasu*, the *Bize*, and *Grippe*, also the *Vent de cers* of France. *Maestro* and *Maestrale* of the Italians; and when light it is called *Mamatele* by the Sicilians. North-north-west, *Provenziale* by the Italians of Leghorn.

A sea breeze, *Imbattu*; a land breeze, *Vento di Terra*, or *Rampinu*; land squalls, *Raggiature*, by the Italians. Mountain storms, *Bur-rasche*, South Italy; and *Raffiche* in Corsica. *Golfada*, a hard gale. *Bonaceia*, calms between land and sea breezes, in Italy; *La Lispa*, a calm with a cloudy sky, in the Strait of Messina, with a fresh breeze blowing outside.

The meeting of opposing winds is called *Contrastes* by the Spaniards. A heavy gale, *Golfada*, by the Italians.

The years in which the east winds prevail are known in the Mediterranean as "*Ano de Levantes*," and of west winds, "*Ano de Ponentes*."

CURRENTS.

Gulf of Lyons.—In this stormy gulf the currents present several peculiarities worthy the attention and care of the seaman. With fine and dry weather the water appears to be drawn into and toward the head of the gulf, although the winds may be blowing off the land from the northward to northeast. Winds from the eastward to southwest round south also cause a current to run into the gulf, but it follows the direction of the wind, and increases in strength as the gulf is entered. Northwest winds force the water out of the gulf, causing a southerly current of from one to two miles per hour to run toward both the outer shores. On the eastern side the current often sets so strong to the eastward as to prevent a sailing vessel working to windward against it. There is believed to be a permanent westerly set close inshore along the east side of the gulf, which is, however, much influenced by prevailing wind.

Coasts of Provence.—The current on these coasts generally sets to the westward following the contour of the land; thus from Cape Mele to Antibes its direction will be about southwest, and thence to Marseille westerly, running at times among the Hyères Islands with great strength. This current is often modified and sometimes reversed by gales of wind, for during and after northwest gales in the Gulf of Lyons it will run to the eastward between Marseille and Toulon. Occasionally after levanters in the Mediterranean an easterly set or current is experienced inshore off Toulon.

Gulf of Genoa.—In this gulf, excepting in very bad weather, a general westerly current of from 4 to 6 miles per day runs along its

shores, except off Spezia, where a weak current is found setting east-southeast near the land, but in the offing it runs west-northwest. From Magra River to Voltri at the bottom of the gulf the current runs northwest; from Voltri to Savona, southwest; from Cavona to Cape Noli, south; and from Cape Noli to Cape Mele, southwest.

This current is usually regular and constant, but both its velocity and direction are often modified by the winds; it runs strongest in the summer, and off the capes often forms eddies.

At the middle of the entrance to the gulf the currents are very variable, and much affected by the force and direction of the winds. With southwest winds the height of the water in the gulf is raised much above the usual level, and is followed afterwards by a southerly current setting out of the gulf.

West coast of Italy.—On this coast between Leghorn and the Strait of Messina the currents are very variable, being subject to the force and direction of the winds. From Civita Vecchia to Naples, however, they run most frequently to the northeast near the land, and the mariner must be careful to guard against them, particularly in very fine weather. The gales in the gulfs of Lyons and Genoa have a great influence on the currents of this coast; with the winds from north to northwest in the former gulf the current at Cape Corso runs east, and amongst the Tuscan Archipelago, east-southeast.

With strong winds from southwest, or a continuance of the libeccio or gusty gales from the same quarter, the level of the water on this coast has been known at times to be raised as much as 12 feet above the ordinary level. During these winds the current will be east at Cape Corso, North and northeast between Corsica and Italy, and northeast on the coast, but after these winds, especially if it blows from the northward in the Gulf of Genoa, the current will run in the opposite direction, sometimes with a velocity of about 2 miles per hour on the northern side of Corsica.

From the above irregularities of the currents, the seamen can not be too careful in using all means possible to verify his position when sailing in this part of the Mediterranean.

In the channel between the coast of Tunis and Sicily the current, under ordinary circumstances, and especially in fine weather, sets to the eastward (especially near Cap Bon and across the entrance of the Gulf of Tunis), at a rate of from $\frac{1}{2}$ a knot to 1 knot. In the middle of the channel, near Skerki Bank and Keith Reef its direction is more variable, and, with westerly winds, it has been known to attain a velocity of 4 knots. In the vicinity of Cap Bon, after a succession of winds from north and northwest, the direction of the current is often to the southward and south-southwestward.

In this channel with a southeast gale it has been found setting east-northeast nearly 2 knots an hour, and at Keith Reef with a northwest wind southeast by east 3 miles on hour; but on other occasions the current has been known to set north-northwest in this locality. The British naval vessel *Thunderer*, during a moderate northwest gale in the month of February, 1881, found between Pantellaria and Cap Bon the current setting southwest by south at the rate of 1 mile an hour.

In the Malta Channel the current ordinarily follows the direction of the prevailing wind; with westerly winds, it often sets strong to the eastward in mid-channel, but near the coast, however, its direction is variable.

Reactions of the tidal stream against the coasts, the effect of winds and the variable currents, induced by the smaller straits in the basin, occasion lateral and adverse currents in all directions. The most marked examples will be found in the Gulfs of Lyons and Genoa, in the Strait of Bonifacio, and in the Gulf of Syrtis. Strong ripples and eddies are frequently met with in the neighborhood of the islands and banks.

French semaphore or signal stations.—On the coast of France the semaphore buildings are placed in conspicuous places; they are generally, but not always, painted yellow, the semaphore apparatus black, and they are all in connection with the French telegraph system. Vessels can communicate with the semaphore stations by means of the International Code of Signals, and a passing vessel can communicate with its owner or receive a message from him by the same means, payment being made according to a fixed tariff. (See International Code of Signals.)

Distant signals, when the colors of flags can not easily be distinguished, can be made by means of a ball combined with one or two flags; at the French stations the distant signals are made also by the semaphore arms.

Distress signals.—Should a shipping casualty occur near a signal station, the following signals will be hoisted at the International code signal mast:

A black flag at the masthead indicates that the casualty has occurred in the immediate vicinity of the station.

A black flag at the yardarm indicates that the casualty has occurred to the right, looking seawards, of the station.

A black flag at the gaff indicates that the casualty has occurred to the left, looking seawards, of the station.

Guns may also be fired every five minutes to attract attention. See also radio signal, page —.

Vessels in distress should make the signal S O S, by radio.

Weather signals—French.—The following signals are hoisted at French semaphore stations and port offices for half an hour in the morning and evening, and indicate the weather existing at sea:

1. A flag of any color indicates weather doubtful; barometer inclined to fall.
 2. A short pendant indicates appearance of bad weather, heavy sea; barometer falling.
 3. A pendant indicates appearance of better weather; barometer rising.
 4. A flag over a short pendant indicates entry into port is dangerous.
 5. A short pendant over a flag indicates the lifeboat is going out.
- In fine, settled weather no signal is made.

Storm signals—French.—Storm signals are made at the semaphore stations and port offices on the coasts of France, and remain hoisted for 48 hours from the time of receiving notice from the minister of marine.

Signal.	Signification.
A cone, point upward.....	Gale probable from northwestward.
Two cones, points upward.....	Gale probable from northeastward.
A cone, point downward.....	Gale probable from southwestward.
Two cones, points downward.....	Gale probable from southeastward.
Two cones, bases together.....	Gale of hurricane force probable.

Sudden shifts of wind.—No signal is employed to indicate a wind which is likely to shift suddenly, but a southerly wind is much more likely to shift to the northwestward than a northerly wind is to shift to the southeastward, and when the south cone is hoisted a vessel should prepare for a gale from the northwestward.

Meaning of signal.—Any of these signals indicates that there is an atmospherical disturbance in existence, which will probably cause a gale from the quarter indicated by the signal used within a distance of about 50 miles of the place where the signal is hoisted, and the knowledge of which is likely to be of use to mariners. Its meaning is simply, "Look out! Bad weather, as indicated, is probably approaching you."

Italian semaphore or signal stations.—On the Italian coasts semaphore stations are generally (but not always) painted in black and white chequers.

The arrangements for signaling are similar—with the exception of the use of the semaphore arms—to those on the coast of France and elsewhere.

The working hours are, as a rule, from sunrise to sunset; but should vessels be in sight the hours will be extended until such vessels are no longer visible; the hours are also extended should there be any special technical, military, commercial, or private reasons. The

semaphores at Palmaria Island and Cape St. Vito, Taranto, are worked continuously day and night.

Italian storm signals.—The following storm signals are in use on the coasts of Italy:

Day signal.	Night signal.	Signification.
A cone, point upward.....	A red light over two white lights, vertical.	Gale probable, commencing from N.W.
Two cones, vertical, points upward.	.....do.....	Gale probable, commencing from N.E.
Two cones, vertical, points downward.	Two white lights over a red light, vertical.	Gale probable, commencing from S.E.
A cone, point downward.....	.....do.....	Gale probable, commencing from S.W.
Two cones, vertical, bases together.	A red light between two white lights, vertical.	Gale probable, direction of wind uncertain.

Standard time.—The official time throughout the Kingdom of Italy is regulated by the mean solar time of the fifteenth meridian east of Greenwich, or one hour in advance of Greenwich mean time, this being the so-called middle European time. In Italy the time is reckoned from 0 h. to 24 h., commencing at midnight.

The standard time in France is mean time of the meridian of Greenwich.

NOTE.—In 1916 a number of European countries adopted a so-called "summer time" which was one hour earlier than the former standard time. It is not known whether this procedure is to be followed in the future.

Weights and measures.—The metric system of weights and measures is used both in France and Italy.

Telegraph.—Telegraphic communication is universal from all ports and islands. Nearly all the semaphore stations on the coasts of France and Italy can transmit by telegraph signals made by the International Code. Submarine cables are mentioned at each port from which they are laid.

Roads.—It may be generally taken for granted that good roads are available in French and Italian territory. The Corniche Road from Nice to Genoa passes through Menton, Ventimiglia, San Remo, Oneglia, Noli, Savona, and Voltri. The road is a mere ledge or cornice, hence the name.

Communication—Railroads.—On the French and Italian coasts intercourse by land or by water is carried on with great facility. The line of railroad commencing at Port Vendres on the French-Spanish frontier, passes through, or within easy access of all the principal ports along the coast, as far as Salerno in Italy, and again southward, through Eboli to Policastro, from thence it skirts the coast to Reggio. From Taranto there are lines to Brindisi,

Naples, and southward, skirting the coast, to Reggio, thus forming a complete system, connected with all the European railroads.

In the Island of Corsica a railroad is completed between Bastia on the northeast coast, to Ajaccio on the southwest, with branch lines to the ports of Calvi and Ile Rouse; and from Bastia along the east coast to Ghisonnaccia, situated inland on the left bank of the Orbo River.

From Marseille the steamers of the Messageries Maritimes de France to Alexandria, Port Said, Cyprus, and Syrian ports. The company Générale Transatlantique to Libia (Tripoli), and the Fraissinet Company to ports on the south coast of France, Genoa, Leghorn, and Naples.

Italian mail steamers (Florio Rubattino) have daily sailings between the Italian continent and all parts of the Mediterranean.

Steamers.—Numerous steamers keep up communication between the principal ports described in this volume, among which are the steamers of the Peninsular & Oriental Company.

(See also information given at the different ports.)

Tides.—See Chapter I, H. O. No. 151, Mediterranean Pilot, Volume I, 1916.

French tidal signals—

BY DAY.—The signals are made from a mast, with a yard across, by means of a black pendant and a white flag with a black diagonal cross and black balls, as follows:

1. The pendant above the flag indicates rising tide.
2. The pendant below the flag indicates falling tide.

No flag or pendant is shown at high or low water.

3. A ball at the left yardarm, as seen from seaward, indicates a height of about 10 inches above the soundings or fixed mark.

4. A ball at the right yardarm, as seen from seaward, indicates a height of $1\frac{1}{2}$ feet above the soundings or fixed mark.

5. A ball at each yardarm indicates a height of $2\frac{1}{2}$ feet above the soundings or fixed mark.

6. A ball placed on the mast below the yard indicates a height of $3\frac{1}{4}$ feet above the soundings or fixed mark.

7. A ball, placed on the mast, above the yard, indicates a height of $6\frac{1}{2}$ feet above the soundings or fixed mark.

8. A ball placed at the intersection of the mast and yard indicates a height of $9\frac{3}{4}$ feet above the soundings or fixed mark.

9. Heights above $9\frac{3}{4}$ feet are given by combinations of the above signals, as shown in the figures opposite.

The signals are not made in complete detail at all ports, but any particular signal has the same meaning everywhere. They may be made for every half meter or every meter of rise only, or indicate with one ball either heights of 1, 2, or 3 meters, or one only of those

three. In some ports they indicate by flag or pendant only, without a ball, the time during which the sea level is above some fixed mark.

BY NIGHT.—The signals are arranged to suit the requirements of each particular port.

Port regulations—British Empire—Vessels inconvenienced by searchlights.—Any vessel approaching a port in the British Empire when searchlights are being worked, and finding that they interfere with her safe navigation, may make use of the following signals, either singly or combined:

(a) By flashing lamp, “four short” flashes followed by “one long” flash.

(b) By whistle, siren, or foghorn, “four short” blasts followed by “one long” blast.

Whenever possible both flashing-lamp signals and sound signals should be used.

On these signals being made, the searchlights will be worked, as far as circumstances will permit, so as to cause the least inconvenience, being either doused, raised, or their direction altered.

The signals should not be used without real necessity, as unless the vessel is actually in the rays of a searchlight it is impossible to know which searchlight is affected.

NOTE.—These signals are designed to assist mariners, and do not render the Government liable in any way.

Signals to be made by vessels inconvenienced by the searchlights of defended ports or of French naval vessels.—Every vessel seriously inconvenienced by searchlights which are being exercised at defended ports or by French naval vessels, should make use, either separately or as far as possible at the same time, of the following signals:—

(a) By flashing lamp, four short flashes followed by one long flash.

(b) By whistle, siren, or foghorn, four short blasts followed by one long blast.

These signals should not be used without real necessity and only when the vessel finds herself actually in the rays of a searchlight, when only can it be seen which searchlight is inconveniencing her, and which will then be doused or its direction altered.

These signals should be repeated until the searchlight has been doused or its direction altered.

Vessels failing to use these signals will be held responsible for accidents that may occur.

French.—All French ports of importance are subject to port regulations, which are strictly enforced, and to which ready attention and obedience should be shown. In some cases anchorage is forbidden within certain areas, and notices are published to that

effect. Mariners visiting French ports should ascertain beforehand what late Notices to Mariners have been issued regarding prohibited anchorages.

For regulations regarding the admission of foreign naval vessels to French territorial waters and ports in time of peace, and for all vessels approaching French territorial waters in time of war, see Appendices V to VII in this volume and Appendix IV in H. O. No. 151, Mediterranean Pilot, Vol. 1, 1916, page 459.

Caution (1917).—It has been found impracticable to touch upon the changes incident to the war, as it is assumed that most of these are temporary. Exceptions to this assumption will be published in the Notice to Mariners, which mariners should carefully consult.

Many of the ports referred to in this publication are closed to navigation, areas prohibited, and lights and aids along the coast discontinued.

Masters of vessels are advised not to approach the coast too closely and are advised to make use of the services of a pilot.

Signals prohibiting entry.—A uniform system of signals has been established to indicate when vessels are prohibited from entering or leaving French ports. This system comprises only three signals, viz, "Entry to the port is prohibited," "Leaving the port is prohibited," and "It is prohibited either to enter or leave the port."

Supplementary signals, applicable to the special circumstances of each port, will continue to be made.

The three signals above mentioned will be made, according to the installation provided at the port, by means of one or other of the two series of signals, as follows:

SERIES A.

	Day.	Night.
Entrance prohibited	Horizontal arm with a disk at the end generally pointing toward the fairway.	Three red lights, vertical.
Vessels prohibited from leaving the port.	Three hexagonal shapes or disks placed vertically.	Three green lights, vertical.
Vessels prohibited from either entering or leaving the port.	Horizontal arm with a disk at the end generally pointing toward the fairway and two hexagonal shapes or disks placed vertically.	Three lights placed vertically, a green between two red.

Special distress signals.—Should a shipping mishap occur in the neighborhood of a signal station, signals will be hoisted at the International Code signal mast as follows:

(a) A black flag at the masthead indicates that the mishap has occurred in the immediate vicinity of the station.

(b) A black flag at the yardarm indicates that the mishap has occurred to the right (looking seaward) of the station.

(c) A black flag at the gaff indicates that the mishap has occurred to the left (looking seaward) of the station.

Guns may also be fired every five minutes to attract attention.

Italian lighthouses.—Signals for assistance are made as undermentioned from the following lighthouses: Isola Santa Maria; Banchi della Meloria, south end, and lightvessel at north end; Isola Palmajola; Formica Maggiore, Formiche di Grosseto; Isola Giannutri; Capo Nero, Isola di Zannone; Capo Colonne (by day only); and Isola di Sant' Andrea, Gallipoli.

A square black flag with a white disc in the middle, by day, or a white Coston light at night, signifies that a doctor is needed. A pendant with four chequers, two white and two black, by day, or a red and white Coston light at night, signifies that the apparatus is damaged. A black ball by day, or a red Coston light at night, signifies that provisions and water are required. A square black flag with a white disc in the middle over a black ball by day, or a white and red Coston light at night, signifies shipwreck.

The lightvessel at night uses a Very light instead of the Coston, and substitutes a yellow light for the white light.

Fog signals—Caution.—On the coast of France it is not always possible to determine the existence of fog bank in the offing; and nearly always an hour may elapse from the time it is considered necessary to use the fog signal until it is first made.

Mariners, therefore, are cautioned that when approaching the land in a fog they should not rely implicitly upon these fog signals, but should always use the lead which, in nearly all cases, will give sufficient warning.

Lloyd's signal stations are established at the following places within the limits of Mediterranean Pilot, Volume II: Pomègues Island, Marseille; Cape Corse and Cape Pertusato, Corsica; Cape dell' Armi, Strait of Messina, Malta, Pantellaria, and Cape Testa.

Radio stations are established at the following places within the limits of Mediterranean Pilot, Volume II: Port Vendres; Les Saintes Maries; Toulon Naval School; Porquerolles Island, Hyeres Islands; Cros de Cagnes, near Nice; Genoa, and Palmaria Island, Gulf of Genoa, Aspretto Point, Ajaccio; Cagliari, Castiadas; Maddalena; Malta; Palermo; Scoglitti; Sferracavallo; Cape Sperone; and Vittoria.

The stations are open from sunrise to sunset, and weather forecasts will be given; telegrams from the stations are distinguished by the letters M M.

A vessel in distress should make the signal S O S, repeated at intervals of a few seconds, and on a reply being received the signal S O S should be repeated, after which the position of the vessel, the nature of the damage, and of the assistance required should be given.

Submarine cables.—On the coasts of Italy the landing place and first direction of submarine cables are marked by two beacons in range; as a rule the beacons are posts, each surmounted by a frame-

work painted white, one of which having the letter T on it painted black. There is also a board where each cable is landed, with notice that anchorage is prohibited near the cable.

Pilots—French.—Steamers of 100 tons and sailing vessels of 80 tons and upward must take a pilot to enter or leave French ports, and also to shift berth if the distance to be moved is 200 yards or above. In some ports vessels drawing $7\frac{1}{2}$ feet and over must take a pilot, whatever may be the tonnage. If a vessel enters or quits a French port without a pilot, the pilotage fee has nevertheless to be paid.

The master of a vessel liable to pilotage should on approaching a port, road, or river, hoist the pilot signal, keeping it flying until the arrival of a pilot having the right to pilot him, or until the vessel is clear of dangers. The first duly licensed pilot offering himself has to be received, and if, for any reason, a second pilot should be received and employed, both have to be paid. Should a local fisherman or boatman be taken in the absence of a pilot, the pilot signal should be kept hoisted, and on a licensed pilot presenting himself he must be given pilotage charge. Every facility must be given to pilots in boarding vessels.

Government vessels, both French and foreign, as well as yachts, pay, as a rule, half the dues fixed for laden vessels of the same tonnage. At many stations there are special rates for these vessels.

During the day, as long as there is a pilot on board, pilot vessels hoist at the mainmast head a blue flag bordered with white (letter S, International Code).

A vessel requiring a pilot shall, by day, hoist one of the following signals:

(1) A blue flag with a white border (letter S, International Code) below the code pendant, or the vessel's national flag, bordered with white.

(2) The International Code signal P T (Require a pilot).

(3) The distance signal, consisting of two balls or two objects resembling balls, over a cone, point upward.

Lights.—On the coast of France fixed lights of the catoptric character (or by reflectors), which are described as being visible through a limited arc, may, from within the distance of 0.3 or 0.4 of their given range of visibility, be seen 55° to 60° on each side of the center of such arc, when not otherwise obscured, or unless the sector is clearly limited by special arrangements of reflectors or screens. Other things being equal the greatest power of these lights is in the axis of the sector, and it is greater the smaller the sector.

Lightvessels.—French and Italian lightvessels do not carry any stay secondary lights to indicate how the vessel is riding. French lightvessels can communicate by the International Code of signals.

Italy—Pilotage regulations—Distinguishing marks.—Italian pilot vessels are painted black with a white band, and the word "Pilota," with number, if any, painted in white on each bow and on the stern. The letter "P" is painted on each side of her sail, or funnel of a steamer.

Each pilot vessel shows a distinctive flag at the masthead, blue-white-blue, vertical stripes, with the letter "P" in blue on the white stripe.

A vessel requiring a pilot shall make one of the following signals:

BY DAY:

1. The national flag with a white border.
2. International Code signal PT.
3. International Code flag S, with or without the pennant above it.

BY NIGHT:

1. Burn a fountain light every 15 minutes.
2. Show a brilliant white light for periods of about one minute, with short intervals between each period, just above the vessel's side.

The pilot vessel will answer by hoisting and lowering her distinctive flag several times if by day, or by showing a flashing lamp at short intervals if by night.

Pilots may not perform towing services without proper license, and pilots are forbidden to transport persons or stores unless in exceptional circumstances.

The pilotage dues include mooring the vessel if it is done within prescribed limits of time, and the vessel may demand the assistance of the pilot vessel, if necessary, on adequate payment.

The ordinary detention fee for the pilot is 10 lire a day, with food and lodging.

If a vessel is detained under circumstances out of the control of the ship's authorities, the detention fee only is payable in addition to the ordinary fees.

Special fees are charged if a pilot is engaged beforehand to go out and meet the vessel, or if a pilot is called to establish communication only.

The pilot, if called, is entitled to his fee whether his services are made use of or not.

If a pilot is retained for leaving, as well as entering, half fees only are charged on leaving.

The bill for pilotage is presented on a special form torn from a counterfoil, and is countersigned and presented by the maritime authority.

Pilot vessels—Lights.—The following regulations with regard to pilot vessels have been adopted by the French, Italian, and Spanish Governments:

Pilot vessels, when engaged on their station on pilotage duty shall not show the lights required for other vessels, but shall carry a "white" light at the masthead, visible all around the horizon, and shall also exhibit a flare-up light or flare-up lights at short intervals, which shall never exceed "15 minutes."

On the near approach of or to other vessels they shall have their side lights lighted, ready for use, and shall flash or show them at short intervals, to indicate the direction in which they are heading, but the "green" light shall not be shown on the port side, nor the "red" light on the starboard side.

A pilot vessel of such a class as to be obliged to go alongside a vessel to put a pilot on board, may show the "white" light instead of carrying it at the masthead, and may, instead of the colored lights above mentioned, have at hand ready for use a lantern with a "green" glass on the one side and a "red" glass on the other, to be used as prescribed above.

A steam pilot vessel, exclusively employed for the service of pilots licensed or certified by any pilotage authority or the committee of any pilotage district, when engaged on her station on pilotage duty and not at anchor, shall, in addition to the lights required for all pilot boats, carry at a distance of 8 feet below her "white" masthead light a "red" light, visible all around the horizon, and of such a character as to be visible on a dark night, with clear atmosphere, from a distance of at least 2 miles, and also the colored side lights required to be carried by vessels when underway.

When engaged on her station on pilotage duty, and at anchor, she shall carry, in addition to the lights required for all pilot boats, the red light above mentioned, but not the colored side lights.

Pilot vessels, when not engaged on their station on pilotage duty, shall carry lights similar to other vessels of their tonnage.

Steering commands.—The system of steering commands, in which the terms starboard and port signify that the vessel's head is to go to starboard and port, and not the helm, have been adopted by Austria, France, Germany, Greece, Holland, Italy, Japan, Norway, Portugal, Russia, Spain, and Sweden.

Uniform system of buoyage—French.—The following system of buoyage, established on the French coasts comprises all marks, fixed or floating, which serve to indicate by day either existing dangers or the limits of navigable channels, i. e., buoys, beacons, beacon towers or turrets, jetty heads, rocks, and convenient natural objects, but does not include ordinary landmarks, mooring buoys, etc.

All buoys and beacons employed are characterized by their color and the shape of their topmarks, but in certain cases the topmarks deviate from the rule, as when lightbuoys, whistlingbuoys, etc.

The term "starboard" means the right hand approaching from seaward; the term "port" the left hand. The term "separation" marks is given to those marks placed at the seaward extremity of middle grounds, the term "junction" marks to those placed at the inshore extremity of middle grounds, and marks placed on shoals of small extent are named "isolated dangers":

1. Starboard marks are painted red and surmounted by a cone. If necessary, they are numbered with even numbers, commencing from seaward.

2. Port marks are painted black and surmounted by a cylinder. If necessary, they are numbered with odd numbers, commencing from seaward.

3. Separation marks are painted white and black in horizontal bands and surmounted by a diamond topmark.

4. Junction marks are painted red and white on horizontal bands and surmounted by a topmark formed of two cones, points together.

5. Isolated danger marks are painted red and black in horizontal bands and surmounted by a sphere.

6. Wreck marks, either buoys or vessels, are painted green. Lights are used according to circumstances. Wreck buoys carry a topmark according to their position, as described in articles 1 to 5, above.

7. Names or numbers on marks are painted white.

NOTE.—Warping buoys in French ports, which are not part of the buoyage system, are painted white.

Uniform system of color for buoys and beacons—Italy.—

The Italian Government has ordered that all the buoys, beacons, and sea marks placed along the coast of the Kingdom shall be painted according to the rule adopted by the Congress of St. Petersburg; that is, red on the port and black on the starboard hand, to vessels entering a port or channel. The new coloring will be applied gradually, and notice will be given as the colors are altered.

Wrecks—Vessels marking.—When lightvessels or other craft are placed to mark the position of wrecks in the ports and roadsteads, and on the coasts of Italy, they will be distinguished as follows, in order that mariners may be able to learn on which side of them they should go.

Vessels marking wrecks will have their top sides colored green, and will exhibit—

By DAY.—Three balls from a yard, 20 feet above the sea; two placed vertically on the side that shipping may safely pass, and one on the other side.

By NIGHT.—Three fixed white lights, similarly arranged.

Mariners will thus know on sighting a wreck-marking vessel that she is so employed; and that they should pass on that side of her on which the two balls or two lights are shown.

On the coasts of France vessels marking wrecks are painted green, and lights are exhibited therefrom according to circumstances; there is no special rule.

Lightvessels.—The French and Italian lightvessels do not carry any stay or secondary light to indicate how the vessel is riding.

Fishing vessels—Lights.—The following regulations with regard to fishing vessels have been adopted by the French, Italian, and Spanish Governments:

Fishing vessels and fishing boats, when under weigh and when not required by these regulations to carry or show the lights hereinafter specified, shall carry or show the lights prescribed for vessels of their tonnage under weigh.

(a) Open boats, by which it is to be understood boats not protected from the entrance of sea water by means of a continuous deck, when engaged in any fishing at night with outlying tackle extending not more than 150 feet horizontally from the boat into the seaway, shall carry one all-around "white" light.

Open boats when fishing at night with outlying tackle extending more than 150 feet horizontally from the boat into the seaway shall carry one all-around "white" light, and in addition, on approaching or being approached by other vessels, shall show a second "white" light at least 3 feet below the first light and at a horizontal distance of at least 5 feet away from it in the direction in which the outlying tackle is attached.

(b) Vessels and boats, except open boats, as defined in subdivision (a), when fishing with drift nets, shall, so long as the nets are wholly or partially in the water, carry two "white" lights where they can best be seen. Such lights shall be placed so that the vertical distance between them shall not be less than 6 feet and not more than 15 feet, and so that the horizontal distance between them, measured in a line with the keel, shall not be less than 5 feet and not more than 10 feet. The lower of these two lights shall be in the direction of the nets, and both of them shall be of such a character as to show all around the horizon and to be visible from a distance of not less than 3 miles.

Within the Mediterranean Sea sailing fishing vessels of less than 20 tons gross tonnage shall not be obliged to carry the lower of these two lights; should they, however, not carry it, they shall show in the same position (in the direction of the net or gear) a "white" light visible from a distance of not less than 1 nautical mile on the approach of or to other vessels.

(c) Vessels and boats, except open boats as defined in subdivision (a), when line fishing, with their lines out and attached to or hauling their lines, and when not at anchor or stationary, shall carry the same lights as vessels fishing with drift nets. When shooting lines or fishing with towing lines they shall carry the lights prescribed for a steam or sailing vessel under weigh, respectively.

Within the Mediterranean Sea sailing fishing vessels of less than 20 tons gross tonnage shall not be obliged to carry the lower of these two lights; should they, however, not carry it, they shall show in the same position (in the direction of the lines) a white light visible from a distance of not less than 1 nautical mile on the approach of or to other vessels.

(d) In fog, mist, falling snow, or heavy rainstorms drift-net vessels, attached to their nets, and vessels when trawling, dredging, or fishing with any kind of drag net, and vessels fishing with their lines out, shall, if of 20 tons gross tonnage or upward, respectively, at intervals of not more than one minute, make a blast; if steamers, with the whistle or siren, and if sailing vessels with the foghorn; each blast to be followed by ringing the bell.

Fishing vessels and boats of less than 20 tons gross tonnage shall not be obliged to give the above-mentioned signals; but if they do not, they shall make some other efficient sound signal at intervals of not more than one minute.

Tunny fisheries.—It may here be proper to remark that on the coasts of France and Italy during certain seasons of the year fishing nets of large size (*madragues* or *tonnara*) are moored for the purpose of catching tunny fish. These nets, which are sometimes at a distance of upward of 1 mile or more from the coasts, should be carefully avoided. In some cases the nets are marked by buoys, or boats, carrying a lantern at night.

The nets off the Italian coast are laid out between March and November, inclusive, approximately, according to the exigencies of the station; their positions are subject to alteration.

The territorial limits in the Strait of Bonifacio, in which the right of fishing is exclusively reserved to the French on the Corsican, and the Italians on the Sardinian, side, are marked by a line through a beacon, 26 feet high, on Guardia del Turco, the northern summit of Isola della Maddalena, and a beacon, 33 feet high, on the rocks at the southern point of Isola Budelli; and by a line through a beacon, 33 feet high, on a rock 550 yards in front of Contra di li Scale, at the northern end of Sardinia, and a beacon 39 feet high, on the coast near Punta Marmorata.

The beacons are white masonry pillars.

A zone of 330 yards on both sides of the limiting lines is open to both nations' fishermen.

The nets and method of fishing are described in H. O. No. 151, *Mediterranean Pilot*, Volume I, 1916.

Marks for tunny nets.—Throughout the coasts of Italy the following rules will be observed for marking the tunny fisheries:

1. Tunny fisheries proper:

(a) The point at which the nets are attached to the shore will be marked by a mast not less than 33 feet in height, surmounted by a disk 6 feet in diameter, painted in concentric white and black bands, and exhibiting by night two fixed white lights 6 feet apart and visible at a distance of at least 2 miles.

(b) The outer left-hand extremity of the nets, as seen by an observer situated at the point at which the nets are attached to the shore, will be marked by a buoy, boat, or floating mark, surmounted by a spar 16 feet in height, carrying by day two black balls placed vertically 6 feet apart and by night two lights placed vertically 6 feet apart, the upper green, the lower white, visible in clear weather at a distance of at least 2 miles.

(c) The outer right-hand extremity of the nets, as seen by an observer placed as in (b), will be marked by day in a manner identical with the above (a mast and two balls) and by night by two lights placed vertically, 6 feet apart, the upper red, the lower white, and visible in clear weather at a distance of at least 2 miles.

The above-mentioned marks will be on the outermost limit of the tunny nets, or placed outside it should the lights be a hindrance or obstacle to the fishing.

2. Smaller tunny fisheries:

(a) The point where the nets are attached to the shore will be marked as above.

(b) The outer end of the nets will be marked by day by a buoy, boat, or other floating mark surmounted by a mast 16 feet in height, with two disks placed vertically, 6 feet apart, and by night by two lights placed vertically, 6 feet apart, the upper red, the lower white, visible at a distance of 2 miles.

3. Tunny fishery nets laid out in an anchorage:

In addition to the foregoing signals, every anchor for nets will be marked by a buoy or other conspicuous mark.

At Malta each seaward extremity of the nets is marked by a nun buoy surmounted by a staff and ball during the day, and at night by a boat showing two fixed white lights, placed vertically, which in clear weather should be seen from a distance of 2 miles.

Caution.—Apart from the damage that may be done to the nets, should a vessel pass through them, they are generally of such a strength that, should a vessel's propeller become fouled, the vessel might become unmanageable.

Coal supply.—The various ports, in this book, where coal may be obtained are enumerated below. The quantity kept in stock and facilities for coaling will be found in the description of the various ports.

Cette, Marseille, Toulon, Hyères, Nice, Savona, Genoa, Spezia, Leghorn, Naples, Salerno.

Malta: Trapani, Palermo, Milazzo, Messina, Licata, Catania.

Porto Torres and Cagliari.

Naval dockyards and establishments are to be found at Toulon, Genoa, Spezia, Naples, Castelmarré, Isola della Maddalena, and Malta.

Dock accommodation.—Dry docks are to be found at Marseille, La Ciotat, Villefranche, Genoa, and Leghorn; floating docks at Genoa; patent slips at La Ciotat, Ajaccio, Leghorn; and Government dry docks at Toulon, Genoa, Spezia, Naples, Taranto and Malta. These are all fully described in their several places.

There are Government and private docks at the following places; the private docks are marked with an asterisk (*):

Malta, Messina,* and Palermo * in Sicily; and Maddalena in Sardinia, this latter being for torpedo boats only. (For particulars, see Appendix I.)

Routes—Gibraltar to Sardinia, Naples, or Sicily, and back—Steamers.—Keep well off the Spanish coast till abreast of Cape de Gata, so as to profit by the easterly current, and, if bound to Naples or Sardinia, steer direct for the southern end of that island, or, if bound to Sicily, direct for its northern side, giving the Keith Reef a wide berth.

In returning keep along the coast of Spain from Cape de Gata.

Sailing vessels—Summer.—With a fair wind pass between Alboran Island and the coast of Spain (about 30 miles distant), and midway between the Balearic Islands and the coast of Africa, along the south coast of Sardinia, and north or south of Sicily, according to the port bound to.

With an easterly wind work to windward in mid-channel, and then between the Balearic Islands and the coast of Africa, keeping nearer the coast of Africa with the wind to the southward of east, but nearer the islands with the wind to the northward of east.

Winter.—Keep along the coast of Spain as far as Cape Palos, and thence make for the southern end of Sardinia, and pass northward or southward of Sicily.

The opposite route in both seasons is to pass along the southern coasts of Sardinia and the Balearic Islands and keep along the coast of Spain from Cape Palos.

Between Gibraltar and the Gulfs of Lyons and Genoa—Steamers.—Keep about 20 miles off the coast of Spain up to Cape San Antonio, and thence direct.

In returning, the route is direct to Cape San Antonio and close along the coast of Spain.

Sailing vessels.—Keep in the middle of the channel whether the wind be from the eastward or westward.

In summer.—Pass through the Majorca Channel, and if bound to Marseille sight Capes Sebastian or Creus before crossing the Gulf of Lyons; but “if bound to the Gulf of Genoa” make the land about the Hyeres Islands. In most cases, bound to Genoa or Leghorn, the sooner the coast of Provence is made, the more secure the voyage, unless the wind should be settled from southeast to southwest.

In winter.—Keep along the coast of Spain up to Cape Creus, where shelter may be obtained in Rosas Bay in case of a northerly gale or bad weather, and thence, “if bound to Marseille,” stand across the Gulf of Lyons and pass well to the westward to Planier Island, but in case of a southeast wind endeavor to make easting as quickly as possible as far as longitude 5° E. “If bound to the Gulf of Genoa,” make the Hyeres Islands.

Sailing vessels round Cape Corso, the northern end of Corsica, in the winter, should give it a berth of 6 or 8 miles, as within that distance dangerous whirlwinds and squalls come off from the cape.

In approaching the northern shore of the Gulf of Lyons, with southerly winds, the greatest caution is necessary, as the currents with these winds set strongly to the northward and northwestward, and many vessels have been wrecked.

On the return voyage vessels should make for Cape San Antonio, and then keep along the coast of Spain.

Gibraltar to Malta and back—Steamers.—Direct to Cape Caxine and thence along the African coast, passing southward of the Sorelle Rocks and Galita Islands, toward Cape Bon; thence northward of Pantellaria and Gozo.

In the reverse route, pass northward of Galita and thence toward and along the Spanish coast from Cape de Gata to avoid the adverse currents.

Sailing vessels—Summer (May to September).—Keep in the middle of the channel until abreast of Cape de Gata, and thence along the African coast as far as Cape Bon, to profit by the easterly current, passing north of Galita Island. Thence proceed direct for Malta, passing northward or southward of Pantellaria and the Maltese Islands, according to circumstances.

In winter (October to April).—Westerly winds (southwest to northwest) principally prevail, and vessels should then keep along the coast of Spain as far as Cape Palos and thence steer for the south coast of Sardinia. Under all circumstances the African coast should be avoided in the winter, as the northerly gales make it a dangerous lee short. From southward of Sardinia make for Cape Bon and pass northward of Pantellaria and Gozo. With a strong southwest wind, however, vessels may keep the African coast as far as Cape Bon.

If leaving Gibraltar with an easterly wind, work to windward in mid-channel as far as Cape Palos and to the southern end of Sardinia. Thence make for Cape Bon, and pass northward or southward of Pantellaria and the Maltese Islands, according to circumstances.

In the return voyage, from Malta to Gibraltar, with a fair wind, after passing Cani Rocks, keep well off the African coast to avoid the easterly current, and make the Spanish coast about Cape Palos, afterwards keeping along it to Gibraltar.

Great care is requisite in making Gibraltar Strait in the thick weather which usually accompanies easterly winds, as vessels mistaking the Rock of Gibraltar for Sierra Bullones (Apes Hill) and supposing they were passing through the strait, and vice versa, have been wrecked in Mala and Tetuan Bays, where the land is low.

With northwesterly winds, vessels should work along the coast of Sicily to Maritimo, taking care to avoid the Graham Shoal, with 2½ fathoms of water over it, which lies about 23 miles from the shore abreast Capo San Marco, and then work across to the south coast of Sardinia and the south coast of Spain. The difficulty of getting to windward with a westerly wind increases as the Strait of Gibraltar is approached, vessels being frequently obliged to remain some days at anchor on the coast. Short tacks should be made along the Spanish coast to avoid the easterly current in mid-channel.

If a northwesterly gale be encountered between Malta and Pantellaria, it is better to put back to Malta rather than risk straining the vessel in the heavy sea then met in that channel.

Another route, and recommended as a better one, is, on leaving Malta, to stand on the starboard tack toward the coast of Africa and work along it up to Cape Bon, and thence, as before, keeping well off the coast of Africa.

Steamers proceeding from ports in the Gulf of Lyons to the Levant take the direct route through the straits of Bonifacio and Messina.

Sailing vessels, however, will not find this passage advantageous in summer, as at that season calms and light winds are often found eastward of Corsica and at the Strait of Messina. It is preferable to pass southward of Sardinia, particularly if on leaving the French coast a northwest wind should be blowing, or there should be signs of the wind coming from that quarter. If on reaching the Sardinia Channel an easterly wind should be found blowing, it is preferable to work to windward on the African shore, where the water is smoother than on the Sardinian coast, and a vessel will benefit by the general easterly current, but in winter the Sardinian coast should be preferred.

Sailing vessels from the west coast of Italy bound to the Levant should pass through the Strait of Messina, taking advantage of every variation of the wind.

If bound to Libia (Tripoli), after passing through the Sardinia Channel and rounding Cape Bon, the islands of Pantellaria, Linosa, and Lampedusa must be passed and a departure from the latter taken if possible. If the wind should be from the northward and eastward, a current should be guarded against, which will most probably set toward the Gulf of Kabes and Kerkenah Islands. If returning from the Adriatic or Ionian Islands the Island of Malta should be sighted and a departure taken from it.

If bound from the Gulf of Lyons to Alexandria or Port Said during the summer, after passing through the Sardinian and Sicily Channels, the Island of Malta should be sighted, passing on either side according to circumstances. From thence a course should be steered for Ras Sem, on the eastern side of which the winds are almost always favorable for proceeding along the coast to the eastward at this season. In winter when north and northeast winds often blow very hard in the eastern basin of the Mediterranean, a vessel after leaving Malta should keep to the northward toward Candia, under the lee of which island shelter may be obtained if necessary, and both ports are within easy reach when the weather moderates.

The following remarks are supplementary to the above directions: Steamers proceeding between ports in the Gulf of Lyons and the

Levant take the direct route through the Straits of Bonifacio and Messina.

Sailing vessels during summer, when calms and light winds often prevail eastward of Corsica and in the Strait of Messina, pass preferably westward and southward of Sardinia, particularly if on leaving the French coast a north-westerly wind is blowing. If on reaching the Sardinia channel the wind is easterly, work to windward on the coast of Africa, where the sea is smoother than on the coast of Sardinia, in the general easterly current, but in winter work to windward from the coast of Sardinia, as directed above or in *Mediterranean Pilot*, Volume I. Sailing vessels from the west coast of Italy to the Levant pass through the Strait of Messina.

Sailing vessels from the southwestward, or the Gulf of Lyons, bound to the Gulf of Genoa, should at all seasons make Îles d'Hyères, and then keep along the coast to Capo delle Mele at a distance depending on the weather; if bound to Leghorn from Îles d'Hyères steer to, and make, Isola Gorgona, and if bound to ports southward of Leghorn pass a short distance northward of Cape Corse, and north or south of Isola d'Elba, according to destination. If on arriving at the entrance to the Gulf of Genoa a northeasterly gale should be blowing, wait under the land westward of Capo delle Mele until it moderates, the gales in the gulf not being of long duration; if caught by a gale in the gulf run and obtain shelter under Isola d'Elba.

In winter, with strong easterly or westerly winds, give Cape Corse a wide berth, as violent squalls and whirlwinds come off the cape and are felt from 6 to 8 miles seawards.

Sailing vessels bound to the Gulf of Lyons from the eastward should, especially in winter, with fresh westerly winds, pass through the Strait of Messina, and northward of Corsica.

CHAPTER II.

THE SOUTH COAST OF FRANCE FROM CAPE CERBÈRE TO CAPE MARTIN.

The Gulf of Lyons, between Cape Creus on the west and Hyères Islands on the east, is about 134 miles wide and 60 miles deep in a northwest direction; it forms a deep bight between the Pyrenees and Alps, and has always been notorious for bad weather, sudden and violent gales, and a heavy confused sea. The latter is one of the great peculiarities of this gulf, a strong breeze even being accompanied by a dangerously heavy "chopping" sea. These lofty and "crowded" waves, together with the extreme violence of southeast and southwest winds, and the want of shelter in its most dangerous part, render the navigation often very difficult.

Directions.—North of the parallel of the Planier the depths decrease gradually; 3 miles northward there are 49 fathoms, 6 miles from 44 to 36 fathoms (the greater depth about $3^{\circ} 50'$ E., the lesser $4^{\circ} 20'$ E.). In these depths a vessel will be at least 9 miles from land. On the above parallel between $4^{\circ} 20'$ E. and $4^{\circ} 45'$ E., there are 40 and 44 fathoms, soft mud; from $4^{\circ} 45'$ E. to the Planier there are from 53 to 56 fathoms. Throughout the gulf westward of Marseille depths of 25 fathoms are, excepting off the mouths of the Rhône, from 3 to 5 miles from the shore; in this latter locality there are from 30 to 50 fathoms at those distances.

Bound to the Gulf of Lyons from the westward the coast of Catalonia should always be kept in sight, so as to pass near Cape Creus, when, should the weather be bad and the barometer below 29.9 in., it would be prudent to await more favorable weather in Rosas Bay, an excellent anchorage, affording shelter from all winds except those from the southeast. Should it be impossible to reach this bay, and the vessel be unable to keep in the offing, run to the westward as far as Cape Sebastian, and there await a favorable change. In all cases it is better to meet a gale on the coast of Catalonia than in the gulf. From eastward the usual landfall is Hyères Islands, and in winter, when once the coast of Provence is gained, it should not be abandoned.

With northerly winds (which blow strong in winter), if bound to Marseille from the eastward and the weather be moderately fine, follow the above directions, keeping close in with the coast of Provence in the evening, as the wind frequently hauls to the eastward during the night. In a northerly gale (orsure), failing the coast of Catalonia, good shelter will be found under the lee of Minorca or, if necessary, at Port Mahon.

With a northwest wind get to the northward as quickly at possible, and reach the parallel of the Planier; should it be made westward of $4^{\circ} 20'$ E. steer for the Faraman Light and then for Cape Couronne and Marseille; if eastward of $4^{\circ} 20'$ E., make for Cape Couronne at once. In making for Faraman Light do not bring it to bear southward of 77° , and to clear the shoal water off the mouths of the Rhône do not bring the light westward of 291° . This course is necessary as there is a probability of the wind either freshening or becoming scant. If the wind becomes scant or freshens to a gale after the parallel of 43° has been gained, keep on; but if either occurrence takes place before that point is reached, the vessel should return to the Catalonian coast.

With westerly or northwest winds if the weather be moderately fine (though it blow strong) steer to make the parallel of the Planier in $4^{\circ} 20'$ E., thence make for Cape Couronne (care must be taken on approaching Cape Couronne, see page —) and Marseille, for it may be expected (and in winter it is almost invariably the case) that the wind will be scant on approaching the land.

With southwest winds in winter the weather is seldom fine; if the horizon be clear to windward and the weather moderate there is a probability of a shift of wind to west and even northwest, especially if the atmosphere become less moist; then, if the barometer be not below 29.5 inches, it is best to cross, taking the same course as with westerly winds. In rough weather if the southwest wind reach the coast of Provence the land will be completely obscured; under these circumstances it is therefore necessary to make the coast in the daytime. After passing a few miles northward of the Planier steer for Cape Mejean, which is the best landfall in thick weather, the land being of more moderate height and generally less obscured than the high land eastward of Marseille; there are also large red and white patches in the vicinity of the cape, which, being usually visible through the mist, serve as good marks, and the coast can be closely approached without danger.

If, when steering for the Planier, the wind should veer to the westward and the weather become clear, make to the northward without delay as far as the parallel of the Planier. If the wind backs to the southward there is every probability of its hauling to the eastward.

With a southwest wind and bad weather, if the barometer is below 29.5 inches, it is better to remain in Rosas Bay or in the offing near Cape Creus, for if the wind reach the coast of Provence it can not be approached even by day, and should it not reach the coast there is almost a certainty of an easterly wind prevailing there.

With a southeast wind get to the eastward as far as 5° E. as quickly as possible; generally in winter, however, it blows hard from this quarter, and is very dangerous from the heavy sea and strong currents it sends into the gulf. If the wind is steady at east with the barometer above 29.5 inches and a moderate sea (even though the sky be cloudy), fair weather may be expected; this is frequently the case in the autumn and sometimes in winter.

With northeast winds at any season, vessels should remain on the coast of Catalonia whether the weather be fine or not, unless they be of moderate steam power.

Caution.—In approaching the northern shore of the Gulf of Lyon with southerly winds the greatest precaution is necessary, as the current with those winds at times sets strongly to the northward and northwest, and many vessels have been carried into the bight of Aigues-Mortes and elsewhere, and have been wrecked. From Cape d'Agde to near Cape Couronne, eastward of the delta of the Rhône, the land is low and marshy with innumerable lakes, and consequently at night or in foggy weather is difficult to be seen; every consideration should therefore be given to the vessel's position, and recourse frequently had to the lead.

Cape Cerbère is the termination of a range of lofty mountains forming the boundary between France and Spain. The surface of the cape is a table land terminating abruptly in steep cliffs. At a little more than $\frac{1}{2}$ mile northward of the cape are two islets named Canadell, with $2\frac{1}{2}$ fathoms between them, and a rock off the coast abreast them.

Cerbère Bay, on the northern side of the cape, is $\frac{1}{2}$ mile deep and affords shelter to small vessels from southerly and westerly winds; a small village is situated on the shore, and good water may be obtained from the rivulet which flows into the head of the bay. The bay may be recognized by a large customhouse barrack, built to the southward of the village. About $\frac{1}{2}$ mile northward of Cerbère Bay is the small Bay of Terrambou; with offshore winds it affords a convenient anchorage for small vessels.

Light.—From a wooden davit over a shed at the signal station at Cerbère at an elevation of 62 feet, a fixed white light is exhibited, visible through an arc of 65° , between Capes Cerbère and Canadell, from a distance of 7 miles. (See Light List.)

Life-saving station.—A rocket life-saving apparatus is established at Cerbère customhouse.

Cape Rederis.—Peyrefite Bay, to the northward of Terrambou, affords shelter under similar circumstances; Cap Rederis, its north extremity, is high with steep cliffs. At 300 yards from it is Bosse Rederis, a rocky shoal of 5 feet water, with 6.5 fathoms between it and the shore.

Cape l'Abeille, a little less than 1 mile from Cape Rederis, is moderately high with three rocks close off it. At 300 yards from them is a shoal of $2\frac{3}{4}$ fathoms with a depth of 6 fathoms between it and the shore. The coast between Capes Rederis and l'Abeille is high, rugged, and skirted by rocks.

Banyuls Bay.—Between Cape l'Abeille and Cape Oullestreil, the coast forms a bight at the head of which are the bay and small town of Banyuls. With offshore winds vessels may anchor in the bight in from 7 to 10 fathoms, sandy bottom; small coasting vessels find shelter within the reef at the head of the bay.

Light.—From a white wooden tower on Cape Dosne, Banyuls Bay, is exhibited at an elevation of 55 feet above high water a fixed white and red light. The white light is visible 5 miles and the red light 3 miles. (For sectors see Light List.)

Life-saving station.—A rocket life-saving apparatus is established at Banyuls customhouse.

Water may be obtained from Rivière Baclaury, a stream which flows into the bay, or from the wells in the town.

Cape Oullestreil is nearly 1 mile northward of the town of Banyuls, the intermediate coast being skirted by detached rocks. A stretch of arid cliffs $\frac{1}{2}$ mile long extends southward to Cape Castell and renders the point conspicuous from the offing.

Cape Béar, on which there is a semaphore 269 feet above the sea, is rugged and sloping toward the sea, terminating in a vertical cliff of about 30 feet in height; on its summit is a lighthouse, and about 3 miles westward of the cape is the Madeloc or Diable Tower, on the peak of an arid mountain, 2,146 feet above the sea. About $\frac{1}{2}$ mile 308° from the cape is a rock on which there is only a depth of $1\frac{1}{2}$ fathoms, with deep water between it and the shore.

Light.—A group flashing white light, exhibited at an elevation of 259 feet from a square stone tower 74 feet in height, painted red and gray, situated near the semaphore. This light is visible 22 miles. (See Light List.)

Paulilles Bay, between Capes Oullestreil and Béar, is about $\frac{1}{2}$ mile deep, with depths of from 3 to 6 fathoms, and is frequented by small vessels when unable to enter the port of Port Vendres during strong northwest winds. There are two small beaches at the head of the bay, on one of which is a dynamite factory. A reef extending northward from Cape Oullestreil, and a rocky shoal of $2\frac{3}{4}$ fathoms (la Lioze) in the middle of the bay, should be avoided.

Anchorage.—Small vessels may anchor north of la Lioze Shoal, but it is exposed to violent squalls off the land and should be only resorted to in case of necessity.

Port Vendres (ancient *Portus Veneris*).—The entrance to the port of Port Vendres is 1½ miles to the northwestward of Cape Béar; the port is small but affords good shelter. It extends about ½ mile in a west and southwest direction, the inner part forming the basin *Obeisque* or Old Port, with an average width of 328 feet and 426 feet in length, and the basin *Castellane* or New Port, 456 feet average width and 1,063 feet in length, separated by the health office, perfectly landlocked, and having from about 18 to 28 feet water alongside the quays. The outer part is 200 yards wide and is protected by a breakwater, which projects 300 yards to the northwest from the eastern entrance point inside the rocks off the point. On the western point of entrance is a fort, and there are others on the southern shore westward of the breakwater; the town stands on the northwest and western shore of the port. Population about 2,400. There are mooring posts along the shore. The heads of the rocks at the Point de la Presqu'île, and that part of the wall appearing above them, are painted black.

The northwest wind blows strong over the Old Port. It is necessary to have two anchors ahead and stern-hauled in to the guns at the foot of the ramparts.

Buoys.—A red buoy with triangular top mark lies about 75 yards eastward of the lighthouse on Point du Fanal, another about 20 yards off Point des Pilotes and a black buoy with cylindrical top mark 25 yards of the northern extremity of Point de la Presqu'île.

Trade.—The trade at Port Vendres is small, but situated as it is on the frontier, with facilities of communication by rail, and in the absence of any other port to the northward nearer than Cette, it is important as a harbor of refuge.

Lights.—An occulting white light, visible 10 miles, is exhibited at an elevation of 98 feet above the sea from a square white tower in Fort Fanal on the western side of entrance to Port Vendres.

A fixed red light, visible 5 miles, is exhibited 67 feet above the sea from a white iron support at end of the breakwater.

Range lights.—A fixed white light, visible 7 miles, is exhibited from a white iron support, elevation of 36 feet above the sea, from the point under and northwestward of Béar redoubt, on the south shore of the port.

A fixed white light, exhibited at 216 yards 204° from the latter light from a window of a house, at an elevation of 67 feet above the sea, is visible 13 miles, over an arc of 32°, or 16° on either side of the range, joining these last two lights, the power of the light increasing as that line is approached. (See Light List.)

Signal station.—There is a signal station at Port Vendres.

Radio.—A naval training radio station at Port Vendres is open in case of distress; call letters F U V.

Directions.—The port of Port Vendres is easily recognized either by day or night; by day it will be known by the light tower and semaphore on Cape Béar, the Diable tower to the westward of it, by Fort San Elme, a little more than $\frac{1}{2}$ mile westward of the town, and by Fort Fanal; by night the lights are sufficient guide.

A vessel may round the end of the breakwater at a prudent distance, and keeping in mid-channel, anchor as convenient. At night the white range lights on the southern side of the harbor in line bearing 204° lead 60 yards westward of the breakwater and into the middle of the entrance. Pilots will be found at the entrance.

Anchorage.—Temporary anchorage during fine weather will be found about $\frac{1}{2}$ mile northward of the port, in 19 or 20 fathoms, or northward of the line of bearing of Collioure church 274° ; the holding is bad eastward of a line joining Fanal Lighthouse and the Madeloc or Diable tower and west of a line joining the same lighthouse and the inner range light. At night the two range lights in line 204° and the light at Cape Béar bearing 167° to 145° will be good marks.

Vessels in quarantine moor eastward of the redoubt de la Presqu'île on the southern shore.

Lifeboat.—A lifeboat and rocket life-saving apparatus are stationed here at the customhouse.

Supplies.—Water may be obtained from fountains and provisions of all kinds may be obtained from Collioure.

Coal.—From 3,000 to 4,000 tons of coal are imported annually, and about 350 tons are kept in stock.

Communication.—Port Vendres is on the Narbonne and Cerbère Railroad, which connects with the Spanish Line from Portbou to Barcelona. The steamers of the Compagnie Générale Transatlantique formerly called here weekly from Marseille to Algerian ports.

Collioure Bay.—Cape Gros, about 600 yards westward of Port Vendres, is high and rugged; $\frac{3}{4}$ mile farther westward is the small bay at Collioure. On its western point is a church, and off the northern point is the small islet of St. Vincent joined to the mainland by a pier, and a breakwater or mole joins the island to the outer rock situated to the southeastward. At about 70 yards eastward of the mole is a rock having only $\frac{1}{2}$ fathom water. The town (ancient Cauliberis) is fortified and occupies a corner on the western side of the bay, and in a sandy creek to the southward are fishermen's houses. There is a railroad station and the population is about 3,651. The bay is frequented by small craft during offshore winds, but it is exposed to onshore winds, which send in a heavy sea.

Anchorage.—Small vessels may anchor in $3\frac{1}{2}$ fathoms off the beach between the church and citadel, during northwest winds.

Light.—A fixed white light, visible 8 miles, is exhibited at an elevation of 43 feet above the sea from a white iron support at the end of the mole. (See Light List.)

Life-saving station.—A rocket life-saving apparatus is established at Collioure customhouse.

The coast from Collioure trends northwestward about $1\frac{1}{2}$ miles, gradually declining in height; at this distance a low beach commences and turns suddenly to the northward for $3\frac{1}{2}$ miles to the Tech River; on the beach are two towers, and the town of Argelès is situated at the foot of the slope. From the mouth of the Tech the low beach, defended by redoubts, continues northward $7\frac{1}{2}$ miles to the Tet River. A little inland are the towns of Elne, St. Cyprien, St. Nazaire, Canet, and Perpignan, the latter being an important fortified town containing a population of about 25,264, with several large manufactories. The Tet River which flows past it upon the north has a course from the west southwestward of about 55 miles.

Within the low shores are the étangs or lakes of St. Cyprien and St. Nazaire, the latter being about $2\frac{1}{2}$ miles in length; it communicates with the sea by a narrow bar entrance.

The bottom along this part of the coast is generally sand, or sand and mud; but there are various rocky patches with from 11 to 18 fathoms water on them, lying in some places about 3 miles from the shore. At 1 mile from the shore there are from 12 to 14 fathoms.

The coast.—From the Tet River a low beach trends north-northeastward for 12 miles to Cape Leucate.

Behind this beach is the étang or Lake de Leucate, about $7\frac{1}{2}$ miles in length and $2\frac{1}{4}$ in breadth; it communicates with the sea by narrow entrances. Several towns are seen from off this part of the coast, Perpignan and St. Laurent being the most conspicuous; the latter lies about 2 miles westward of the entrance to the small river l'Agli.

Port of St. Laurent, close northward of the entrance, consists of a few houses and a battery on the beach, where vessels land and embark goods.

Light.—A fixed red light, visible 5 miles, is exhibited from a white iron support above a hut, elevated 24 feet above the sea, at the village of Barcarès, on the beach. (See Light List.)

Cape Leucate is of moderate height, whitish, and slightly projecting; on its summit is the town of the same name, and on the slope, a castle in ruins.

Semaphore.—Near the extremity of the cliff is a semaphore station 174 feet above the sea, the house and tower are white and 30 feet high; the mast is black.

Life-saving stations.—There are life-saving stations at Argèles, St. Cyprien, Canet, Barcarès, and Franqui.

Anchorage.—On the northern side of Cape Leucate the shore forms a slight bay having an opening into Étang de la Palme. The Franqui bank with $1\frac{1}{2}$ fathoms on it extends across the bay in a northwestern and southeastern direction, between which and the opening into the étang there is anchorage for small coasting vessels. With offshore winds large vessels may anchor at 1 mile from the shore in 9 to 10 fathoms, or farther out if necessary.

La Nouvelle.—At $5\frac{1}{2}$ miles northward of Cape Leucate is the entrance to canal Robine leading to La Nouvelle and into the étangs Sigean and Bages, which extend 8 miles in the direction of Narbonne, of which La Nouvelle is the port. La Nouvelle (with a population of about 2,000) stands on the southern side of the canal 1 mile from its entrance, which is about 150 yards wide, and formed between two jetties projecting 547 yards from the beach. Between the moles there are 19 feet of water. Vessels should enter with caution. The entrance is sometimes impracticable during strong east or southeast winds.

Pilots in fine weather will be found off the entrance. In bad weather they await vessels at the entrance. When unable to board a vessel the pilot will direct her, using a flag by day and a light at night. The pilot lookout station is on the tower of Fort St. Charles at the shore end of the southern pier.

Bar signals.—Signals as to state and depth of water on the bar are made from the pilot lookout station. The signals made are in accordance with the uniform system of tidal signals in use in France and the heights of water are observed at a distance of 131 to 164 feet from the pierheads; beyond that distance sand banks do not form.

The condition of the sea upon the bar is reported by means of a red pendant, indicating that there is a swell, and by a red flag when the channel is impracticable.

Lights.—A group flashing white light, visible 13 miles, at an elevation of 50 feet above high water, is exhibited from a white iron lighthouse situated at the head of the south mole.

A fixed green unwatched light, visible 4 miles, is exhibited from an iron support over a white shed situate at the head of the north mole, at an elevation of 33 feet above high water. (See Light List.)

Lightbuoy.—A black lightbuoy, from which is exhibited a fixed red light, is moored 150 yards from the head of La Nouvelle South Jetty, and in the line of its prolongation, to mark the outer part of the extension works in progress.

Vessels must not pass between this buoy and the head of the jetty.

Jetty being extended—Buoys.—The north jetty at Port la Nouvelle (1913) is being extended 40 yards in a direction parallel

with the south jetty, and the work is being carried on in conjunction with the work on the south jetty.

Red nun buoys mark the extension work of the north jetty.

The temporary dangers in connection with the work on both jetties may be avoided at night by the aid of three lights: The flashing white light on the south jetty, the green light on the north jetty, and the red light on the lightbuoy.

Lifeboat.—A lifeboat and rocket apparatus are stationed here.

Communication.—The Narbonne, Papignan & Port Vendres Railway crosses the canal at La Nouvelle, where there is a station.

Narbonne (ancient Narbo Martius), partly surrounded by a wall flanked with towers, stands in a fine plain about $10\frac{1}{2}$ miles northward of the entrance to Nouvelle, or Canal de la Robine, and on the line of railroad between Port Vendres, Bordeaux, etc. It is divided by the canal into two nearly equal parts, and is connected by three bridges; the streets are narrow and tortuous, but the esplanade in the center of the town is a fine open space. The cathedral is one of the finest specimens of Gothic architecture in Europe. It has several manufactories and carries on a trade in wine, brandy, silk, oil, salt (obtained from the neighboring lakes), wax, and honey, the latter said to be the finest in the world, which are exported partly to Bordeaux by the Canal du Midi, and partly to the markets in the Mediterranean by its Port of la Nouvelle; the population is about 28,500. The Canal du Midi or Languedoc connects the Garonne at Toulouse with the Mediterranean.

The coast.—From the canal of Nouvelle a sandy beach, on which are the towers of la Vielle Nouvelle and Montolieu, trends to the northeast for 11 miles to St. Pierre Point, the termination of the mountain of la Clape, which rises over this part of the coast. The Grau de la Vielle Nouvelle, $2\frac{3}{4}$ miles beyond the canal, is the shallow entrance to the Étang de Gruissan, which is separated by a long narrow strip of level land from the Étang de Bages; the town of Gruissan with its windmills is about 3 miles northward of Grau de la Vielle Nouvelle on one of the arms of the lake, which has a second outlet by a rocky channel southeast of the town, called Grau du Grazil. St. Pierre Point has a tower and redoubt on it, and $\frac{1}{2}$ mile to the northeastward is a battery, off which rocks extend about 200 yards. The land then becomes low and marshy, and 2 miles farther on is the tower and redoubt of Vendres, between a small lake with a shallow rocky outlet and a branch of the Aude River.

Life-saving stations.—There are life-saving stations at Vielle Nouvelle and St. Pierre.

Aude River, 3 miles northeastward of St. Pierre Point, communicatés by a canal with the Etang de Vendres, at the head of which lake, about 3 miles from the beach, is the town of the same

name. Off the mouth of the Aude the water is very shallow for nearly $\frac{1}{2}$ mile; and 1 mile to the southeast is Banc de Vendres, a rocky bank of 10 fathoms about 1 mile in extent. There are, however, no dangers, and the coast may be approached by the lead.

Orb River.—Three miles beyond the Aude is the entrance to Orb River, on the left bank of which, $2\frac{1}{4}$ miles from the beach, is the town of Sérignan.

Light.—A fixed red electric light, visible 5 miles, is established on the head of the west jetty at the mouth of the Orb River.

The light is exhibited 24 feet above the sea from a white metal column 18 feet high.

Life-saving stations.—A rocket life-saving apparatus is established at Valras village on the western side of the mouth of the Orb River and another at Roque Haute, 2 miles to the northeastward.

Herault River is $6\frac{1}{2}$ miles eastward of the mouth of the Orb, the beach between curving a little to the northward; half way between is the town and redoubt of Roque. The entrance to Herault River is about 100 yards wide between two moles which project 300 yards southward from the coast, and has a depth of 8 feet in the fairway. The towns of Portiragues and Vias are situated 2 and $1\frac{1}{2}$ miles inland.

Shoal.—A shoal, with about 6 feet water, extends about 350 yards southward from the western molehead, and there is a curved channel, about 50 yards wide, with 12 feet water, between the shoals and the eastern mole.

Lights.—A fixed red unwatched light, visible 5 miles in clear weather, is exhibited at 41 feet above the sea, from a small white tower, surmounted by a black ball, on the western mole head at the entrance to Herault River.

A fixed white light, visible 10 miles, is exhibited at 41 feet above the sea from a small white round tower on the eastern mole head.

Pilots.—There is a pilot and an assistant. Vessels are boarded 2 miles off the entrance in fine weather, and in bad weather, when the pilot is unable to go out, he directs vessels by signals with a flag from a boat in the entrance. The pilot station is about 400 yards within the inner end of the eastern mole.

Tidal signals.—Signals indicating the height of water will be made from a mast and yard at the entrance of Herault. The signals are made in accordance with the uniform system of tidal signals in use in France.

The condition of the sea upon the bar is reported by means of a red pendant, indicating that there is a swell, and by a red flag when the channel is impracticable.

Tides.—The tide is insignificant, but with northwest winds the river may suddenly lower as much as 3 feet. During the season of

floods, from November to May, the current is sometimes very strong, and at the entrance runs to the southward, but is not felt more than $1\frac{1}{2}$ miles off.

Lifeboat.—A lifeboat is stationed here, and the station is provided with life-saving apparatus. There is also a gun life-saving apparatus at the mouth of the Libron River.

Agde (ancient Agatha), situated on the Herault River, about $2\frac{1}{2}$ miles from the sea, is entirely built of black basaltic lava and, being surrounded by a wall with towers of the same material, has a grim appearance and is called by the country people the *Ville Noire*; it contains a population of about 10,000. The Canal du Midi passes the northern side of the town, between it and the town of Vias. It has some foreign and a considerable coasting trade, shipbuilding is carried on, and there are distilleries and manufactures of verdigris and soap. Vessels of about 9 feet draft can go up the Herault to the town. The land in the immediate vicinity of the river is very low; on nearing it, trees, houses, and cultivated ground will be seen.

The Canal du Midi, sometimes called the *Canal des Deux Mers*, because it unites the Mediterranean with the Atlantic, was commenced in 1666, but not really finished as far as the Rhône until the beginning of the last century. It measures from the basin, where it joins the Garonne at Toulouse, to near Agde, where it falls into the Mediterranean, 155 miles; it is 65 feet wide at the surface and 32 feet at the floor.

The summit level is 719 feet above the Mediterranean, and there are 46 locks on the declivity toward the Mediterranean and 18 between the summit level and Toulouse. It is navigated by barges of 100 tons.

Cape d'Agde, 3 miles eastward of the Herault River, when seen from the eastward appears to descend in a gentle slope and terminates in a low, rocky point, on the summit of which is a battery; the intermediate shore is also low and terminates in a beach which is bordered to the distance of 800 yards with shallow water and rocky patches. Mount d'Agde, a conical hill, with a chapel and electric semaphore on it, is $1\frac{1}{4}$ miles northward of the cape and about the same distance to the southeast of the town; on its southern slope is an old castle.

Brescou Islet.—About $\frac{3}{4}$ mile to the southwestward of Cape d'Agde is Fort Brescou, on a low, rocky islet 300 yards in extent, with a reef extending 800 yards to the northwestward and some isolated rocks in the same direction.

Light.—A flashing red light, visible 14 miles, is exhibited at 69 feet above the sea from a round black tower on the southeastern bastion of Fort Brescou. (See Light List.)

L'Ane Rock, on which there is only a depth of 1 foot, lies a little more than 150 yards southwestward of the lighthouse on Brescou Islet. The rock is the shoalest part of a narrow reef which extends about 40 yards from it in the direction of the lighthouse northeastward, and on which there is a depth of 1 fathom. A detached rock, on which is a depth of 13 feet, lies 20 yards about 134° from l'Ane Rock.

Aloze Rock and Beacon.—From the western part of Cape d'Agde a mole extends 800 yards in the direction of Brescou Islet, leaving a channel of 800 yards between the two; in the middle of this channel is Aloze Rock, with 2 feet water on it and marked by a beacon tower.

Anchorage.—One mile 308° from Fort Brescou is a battery on a point which terminates in a reef between which and the rocks to the northwestward of Brescou Islet there is a narrow channel carrying 9 feet water to an anchorage southward of the fort in from 12 to 18 feet, sand and weed. It is better to pass between Aloze Rock and the end of the mole, for though the passage is narrow it is more direct and carries 17 feet water. It requires, however, care and vigilance in taking up this anchorage. Local knowledge is necessary to use these channels; the chart is not a sufficient guide.

There is also anchorage with westerly winds on the eastern side of Cape d'Agde, in any convenient depth.

The coast from Cape d'Agde takes a northeastern direction for 11 miles to Port Cette. It is a low, narrow beach separating the Étang Thau from the sea.

There are 9 fathoms water, at the distance of 1 mile from the land, and from 12 to 14 fathoms at 2 miles, mud bottom, except near the shore.

Life-saving stations.—There is a gun life-saving station at la Quinzième, 4 miles northeastward of Cape d'Agde, and another at Villeroi, situate to the southwestward of Mount Cette.

The Étang Thau is an extensive lake with a depth of from 1½ to 6 fathoms water. On the shores of the lake are the ports of Marseillan and Méze, besides several villages.

Lights.—A fixed white unwatched light, visible 8 miles, is exhibited at an elevation of 21 feet from a beacon tower, painted red and black in horizontal bands, erected on Roquerols, in Lake Thau. Also from a white turret at the entrance to Cette Canal (in Lake Thau), at an elevation of 16 feet above high water, is exhibited a fixed green light, visible 2 miles.

A fixed white light, visible 8 miles, on the east pier head at Méze, in Lake Thau, is exhibited from an iron pole, 19 feet high, surmounting a white shed.

A fixed red light is exhibited from the west pier head. (See Light List.)

A fixed light with green sector is exhibited at an elevation of 34 feet above high water from a masonry turret on the pier head of the Canal du Midi, Onglous, in Lake Thau. The white light is visible 11 miles and the green sector light 5 miles. (For sectors see Light List.)

Beacons.—There are several beacons in the Étang Thau, for positions of which see the chart.

Mont de Cette, 590 feet high, with a semaphore on its summit, resembles Mount d'Agde, and at a distance both appear like islands, being in the vicinity of lowland and lakes. It has an old hermitage and a white tower on it, is higher than d'Agde, and its top more level, and is easily distinguished from the former from its having highland a short distance to the northeastward of it.

Cap de Cette is the southeastern extremity of the mount; there is a battery on it, and Fort Saint Pierre and Citadelle Richelieu are a little to the northward.

Signal station.—There is a semaphore on the summit of Mont de Cette; the house and tower are white and 28 feet high; the mast is black.

Cette Approach—Fairway reserved for traffic when submarine vessels are exercising.—When the flag with a yellow and a red horizontal stripe is hoisted at the signal stations or on the vessel escorting submarine vessels, to indicate that the latter are exercising submerged, all vessels wishing to enter or leave the port of Cette are earnestly requested to make use of the fairway defined below, in which submarine vessels are prohibited from exercising submerged. (See Regulations relative to submarines.)

This fairway is limited as follows:

On the north, by the coast eastward of the port.

On the south, by the alignment of St. Clair Lighthouse with the lighthouse on the eastern extremity of the breakwater.

On the east, by the meridian of Frontignan Steeple.

Wreck.—The wreck of the steamer *Obéron* lies sunk eastward of Castelas Redoubt.

Cette.—The town of Cette lies at the foot of Mount Cette, on the eastern side and partly on a narrow neck of land separating Lake Thau from the sea; on this strip of land are extensive salt works. It is well built, possesses a good hospital, but derives its chief importance from its harbor and from its being the port on the Mediterranean side of the Canal du Midi. The harbor is formed by two lateral moles, named St. Louis, projecting in an easterly direction from the foot of Mount Cette, and Frontignan Jetty on the east, 1,900 and 1,600 feet long; further protection is afforded by a break-

water which extends across the entrance. The harbor has from 21 to 25 feet water, as shown from the chart (a recent report states that there is a depth of from 18 to 34 feet), and with its basin maritime canal, and wet docks, can accommodate in safety a large number of vessels; a vessel of 24.6 feet draft has entered. In the angle formed by the Frontignan Jetty and the east mole of the new basin, vessels laden with petroleum are berthed.

A broad and deep canal bordered with quays flows through the town communicating between the harbor and the étang Thau, and consequently with the Canal du Midi and the Garonne on the one hand and with the Rhône on the other. Cette contains shipbuilding yards and is the center of considerable trade.

Cette was founded by Louis XIV in 1666, and had in 1903 a population of 36,540; it is connected by railroad and electric telegraph with every part of France and Spain; there is daily communication by steamers with Marseille, also weekly to Port Vendres and Oran (Algeria), and a weekly line of steamers to Tunis.

Close to the northeastward of Cape Cette (at the foot of Mount Cette) is the fort of St. Pierre, and $\frac{1}{4}$ mile northward of the latter is Richelieu citadel commanding the port and town.

The population of Cette in 1911 was 33,892.

Buoy.—A sphero-conical buoy painted black with cylindrical top-mark is moored just outside the 3-fathom curve to the southwestward of Cape Cette to mark the spoil ground.

Wet docks.—In the Petroleum Basin there are 130 yards of wharf. Old (Vieux) Basin, with the exception of the Quai Richelieu, is devoted entirely to fishing vessels.

The channel (chenal) has depths of 16 to 22 feet; the quays on both sides have a depth of 25 feet alongside. At the northern end of the Canal de Cette are two swing bridges giving access to the Étang de Thau.

New (Nouveau) Basin or Darse, entered on the south from the outer port, is 820 feet long, 820 feet wide, width at entrance 160 feet, has a depth of 24 feet and an area of $17\frac{1}{2}$ acres. Canal Maritime has a depth of 23 feet and Canal Latéral has 24 feet. Basin de la Compagnie du Midi is 1,418 feet long, 328 feet wide, with a depth of 23 feet at the quay; the Maritime Canal connects with the New Basin.

Harbor.—The western entrance to the port of Cette is 300 yards wide, the deepest water being in mid-channel.

At 95 yards 134° from St. Louis Lighthouse is Pilon, a square pillar of masonry 16 feet high, which marks the extremity of the rocks bordering the mole.

The entrance to the harbor is very good from the northward, between the breakwater and the mainland. The depths are from 28 to 32 feet. There is no bar, the depths decreasing gradually to the

shore. There is a good anchorage about 1 mile northward of the breakwater when the wind is off the shore.

The outer harbor has depths from 18 to 34 feet. There are no quays. Vessels lay moored to both anchors out forward, stern to shore, well moored aft by big cables from both quarters.

During the winter it often blows very hard from the southeastward, bringing some swell into the harbor.

The inner harbor has a number of quays for berthing vessels, with depths from 16 to 33 feet.

Harbor works.—A new harbor is projected, which lies northwestward of the old inner harbor.

The eastern entrance is little more than 200 yards wide. In entering keep St. Louis Mole Lighthouse open to the southward of Frontignan Jetty Lighthouse. There are two black mooring buoys within the breakwater. In entering by either passage the direction of the wind, sea, and current should be considered, and a stranger can always avail himself of the services of a pilot, except in bad weather, when they are unable to get out. Attention should be paid to the sectors of lights shown from St. Louis Lighthouse and from the breakwater central lighthouse. During fresh winds from the offing the sea breaks right across the eastern entrance.

Port regulations.—All vessels when under way inside the port must hoist their national flag.

The swing-bridges will be opened on request as follows:—

From April 1 to September 30, from 5h. 30m. a. m. to 7h. p. m.; from November 1 to February 28, from 7h. a. m. to 6h. p. m.; during March and October, from 6h. a. m. to 7h. p. m.

Nevertheless, the bridges will remain closed every day from 8h. a. m. to 9h. a. m.; and from noon to 1h. p. m., and also any other time the port service may consider necessary.

Independently of the hours fixed above, the bridges will remain closed, Sundays and holidays, from 10h. a. m. till noon, and from 2h. p. m. till night.

During the night and at all hours for closing during the day, but outside the intervals the port service may consider necessary, the captain of the port may allow the passage through a bridge, at a time he will fix, provided a request is made two hours in advance by day, and for movements at night before the hours fixed above as normal limits.

The captains of vessels passing through a bridge on Sundays or holidays must lend assistance in working the bridge.

The bridges will not be opened until a vessel has made the necessary arrangements to effect a quick passage through. Should a vessel not be able to pass through the bridge when she is in the

passage, she must drop astern if requested to do so by the bridge man. No vessel or boat is allowed to remain in the bridge channel.

All vessels going with the current have preference over those going against it in passing the bridges. The vessels are admitted to the channel in the order they arrive each way, and two vessels must never pass together.

Petrol.—Vessels carrying petrol or other inflammable matter, are berthed in Bassin Petrole; should there be no room there, and, on account of the weather, it would be dangerous for a vessel to remain outside the port, the captain of the port may allow a vessel to be berthed at 4-5 jetty in Outer Port, all necessary precautions being taken. The same berth may be given to vessels which have discharged their cargoes and wish to leave at once. Other regulations for vessels carrying small quantities of petrol, for discharging petrol, and for watchmen, are the same as at other French ports.

Buoys.—Two black mooring buoys lie in $2\frac{1}{2}$ fathoms on the northern side of the curved breakwater.

A lifeboat and rocket apparatus are kept at Cette. The lifeboat station is in the old basin.

Directions.—Steamers entering by East Pass keep southward of the alignment of the lighthouses of Mole St. Louis and Jetée de Frontignan, or at night keep in the white sector of Mole St. Louis light, with Mont de Cette light just northward of it. After passing the lighthouse on the eastern end of the breakwater, bring Mont de Cette and Mole St. Louis lighthouses in range, which leads close southward of Jetée de Frontignan, when turn into Outer Port.

Entering by West Pass, keep Jetée de Frontignan lighthouse well open southward of Le Pilon until past the black buoy southwestward of Cap de Cette, and when in the pass do not close Mole St. Louis within 200 yards until past Le Pilon.

At night, keep in the white sector of Mole St. Louis light until the white light on the breakwater is visible, and then steer for it until within the western arm of the breakwater.

Then steer for Jetée de Frontignan light, and when the lights at the entrance to Nouveau Bassin are well open eastward of Le Pilon, turn into the Outer Port, giving Le Pilon a berth of not less than 100 yards.

Pilotage.—Pilots constantly cruise between Ilot de Brescou and Gulf of Aigues-Mortes, both by day and at night, in favorable weather. When unable to go out, pilots are stationed at the entrance to the passes, and also near the breakwater, if possible. Pilotage is compulsory.

Sailing vessels.—On making for Cette it should be remembered that when the wind is not from south-southwest to west-northwest the

chances are the current near the coast will be found running to the southwest; with winds from southeast in the offing it is often blowing northeast on the coast.

Vessels from the southward, after rounding Cape Creus with winds from southeast, should stand to the northeastward and so make the land well to windward of the port. A vessel to leeward will have both wind and current against her, and should at once put to sea and not get embayed on a low coast, covered with mist and difficult to be seen, a heavy swell, and no port of refuge. Vessels from the eastward should also make the land to windward and so profit by the current and not risk missing the entrance.

Current.—On the coast the current running to the southwestward is deflected by the Frontignan Jetty across the eastern entrance; in light winds vessels should be prepared to anchor to avoid being set on to the breakwater. In the road the current sometimes is very strong along the breakwater.

With northwest winds the current generally runs from Lake Thau, and in the canal attains a speed of 2 knots; with winds from seaward the contrary is the case, and the current then runs into the lake.

Lights.—A group occulting light with red sector is exhibited, at 105 feet above the sea, at the end of the mole head of St. Louis, on the western side of the entrance of the port, from a white round tower.

The white light is visible 16 miles and the red-sector light 12 miles. (For limits of sectors, see Light list and chart.)

On the extremity of the Frontignan (eastern) mole, from a small white tower, is exhibited, at 44 feet above the sea, a fixed green unwatched light, visible $3\frac{1}{2}$ miles.

There is also a red light on the west and a green light on the east side of entrance to New Basin.

A fixed white light is exhibited from a small white tower on the center of the breakwater fronting the entrance to the port at 46 feet above the sea, visible 11 miles.

A fixed red light is exhibited from a white tower, constructed of masonry, at the eastern end of the breakwater, it is elevated 69 feet above the sea, 62 feet above the breakwater, and is visible 5 miles.

As this light is not constantly watched, it should not be implicitly relied on.

A white flashing light is exhibited at an elevation of 303 feet above high water, from an octagonal white stone tower 62 feet high, erected on Mont St. Clair, at a distance of 920 yards 264° from the lighthouse on St. Louis Mole Head, visible 24 miles. (See Light List.)

Caution.—When the St. Louis light shows red vessels should not approach the harbor until the white light is seen, when vessels may safely approach either of the channels into the harbor.

Sea level.—The wind causes considerable variations in the height of water. On December 25, 1870, during a heavy gale from south-east, the water rose rapidly 3 feet; on July 14, 1841, without any apparent cause, it rose 5 feet in a minute, making a number of oscillations before returning to the ordinary level.

Trade.—The principal exports are wines, liqueurs, alcohol, lime, superphosphates, and bauxite; the imports are coal, coal-tar, cork, cereals, mineral oils, chemical manures, phosphates, sulphur, oak staves, and wines. The sardine and oyster fisheries are successfully carried on along the coast, and the salt works of the adjoining lakes are extensive.

Consul.—The United States is represented by a consular agent.

Communications.—There is a regular steamer sailing every second day to Marseille and regular lines of steamers to other French and Spanish ports. Railroad communications are very good to the north and south. Telegraphic connections are very good to the whole world.

Coal—Supplies.—About 1,400 tons are usually in stock. Any quantity of French coal can be delivered in three days from the mines. Coaling is performed from lighters or from a wharf, 2,500 feet long, with a depth alongside of 23 feet. Supplies are plentiful; the water is very good and is supplied by pipes on the quays or by tank vessel, to be ordered two days before wanted.

Hospital.—A mixed hospital will receive men from naval vessels. The crews of merchant vessels are admitted at a charge.

Repairs.—There are two engine works at Cette, and any repairs not requiring the use of a dry-dock can be executed.

Pilots are found off the port 1 or 2 miles in a small steamer, and pilotage is compulsory. In bad weather they signal with a tricolor flag, held in the hand, at the east entrance, the direction a vessel should steer.

Tugs.—In calms or light breezes the services of a tug can be had, but with strong winds from the offing they do not go out.

The coast.—From Cette a low narrow beach trends eastward and northward to the landing place of Palavas, a distance of 13 miles; within the beach is a chain of lakes, the principal of which are the Palavas and l'Aruel, with the towns of Frontignau, Vic, and Mirevals; the square steeple of the former at 4 miles northeast by 43° east from the port of Cette is the best mark on this part of the coast; at the back are hills of Gardiole and Bauzeli, 774 feet and 614 feet high, which from the west seem a prolongation from Mount Cette; on the beach are several coastguard stations.

Rocky banks, with from 4 to 6 fathoms water on them, extend 2 miles off this coast, the depths shoaling toward the shore. The landing place of Palavas is at the outlet of a small river named Lèz,

which flows between two moles, by which small coasting vessels enter the lakes; there is a redoubt at the mouth of the river.

Life-saving station.—Rocket apparatus are established at La Peyrades and Morin custom houses.

Lifeboat.—A lifeboat is stationed at Palavas, and the station is also supplied with rocket and gun life-saving apparatus; there is also a rocket apparatus at Grau de Pérols.

Lights—Grau du Palavas.—Two fixed red range lights in line; 326° , each visible 2 miles, are exhibited at the east mole, 44 yards apart. "The front and rear lights are exhibited from structures 12 and 14 feet in height, respectively, and at elevations of 18 and 22 feet."

Gulf of Aigues-Mortes.—From Palavas the coast curves to the eastward and southeast for $9\frac{1}{2}$ miles to the Grau du Roi, and from thence southward 3 miles to Espiguette Point, forming a bight known as the Gulf of Aigues-Mortes. The shores consist entirely of a low, narrow, sandy beach, behind which are a series of lakes, and nearly in the center is a redoubt; it is skirted by rocky banks of 4 and 5 fathoms water, extending $1\frac{1}{2}$ miles from the shore. The town of Montpellier is $5\frac{1}{2}$ miles northward of Palavas. A canal traverses the whole distance from Agde at about $\frac{1}{2}$ mile from the shore.

The Grau du Roi, which may be recognized by the old lighthouse and numerous houses, is the entrance to the canal of Grande Roubine leading to the town of Aigues-Mortes, 3 miles inland in an east-north-east direction. The entrance, formed between two moles, which extend about 200 yards from the beach, is about 65 yards wide, with a depth of 13 feet, decreasing to 11 feet within the canal. Vessels drawing 10 feet can only enter under favorable circumstances, as the sand in the vicinity of the Grau is constantly accumulating.

Aigues-Mortes, a town with a population of about 4,000, is situated in the midst of salt marshes and lagoons, the exhalations from which render it unhealthful. It is half-deserted, but is of interest as a perfect example of a feudal fortress in the thirteenth century. Aigues-Mortes was formerly a seaport, but owing to the retrogression of the sea, is now rather more than 3 miles inland. Salt is the principal production, and the population are chiefly engaged in fishing.

Lights.—A fixed red light, 33 feet above the sea, is exhibited from a white iron turret on the North mole head of the Grau du Roi, visible 6 miles.

A fixed white light, 33 feet above the sea, is exhibited from a white iron turret on the head of the South mole, and is visible 8 miles. (See Light list.)

A light is exhibited from the middle of a swing-bridge 580 yards within the mole lights.

Lifeboat.—A lifeboat and rocket life-saving apparatus are stationed at the Grau.

Anchorage.—The anchorage of Aigues-Mortes affords shelter with northerly winds as far round as east-southeast; with all other winds it is much exposed. Anchor in 6 or 7 fathoms, mud, with the Grau lights bearing 49° and Espiguette Point Light 139° , 2 miles from the shore.

Espiguette Point is a round low sandy point projecting to the southwest, and conspicuous by its light tower. At $\frac{1}{2}$ mile from it there are 5 and 6 fathoms water, and at 2 miles from 8 to 10 fathoms. The point is advancing seaward at the rate of 16 yards annually.

Villa Leenhardt in line with the South mole light-turret leads westward of the shoals, in $3\frac{1}{2}$ fathoms water.

Light.—A group flashing white light, visible 15 miles, is exhibited 88 feet above the sea on Espiguette Point from a square tower. (See Light List.)

Semaphore.—An electric semaphore is erected on the point.

Life-saving station.—A gun life-saving apparatus is kept at the lighthouse.

Grau d'Orgon.—From Espiguette Point a sandy coast backed by low, marshy land, with numerous small lakes, trends round to the east-southeast to the Grau d'Orgon or mouth of the Little Rhône, a distance of 12 miles. About $3\frac{1}{4}$ miles eastward of Espiguette Lighthouse is a small redoubt tower, and on the western point of the Grau d'Orgon is a beacon and the ruins of a battery, a little within which is a guard or customhouse; the wood of la Pinede, with the tower of the Four Maries, will be seen $3\frac{1}{2}$ miles to the westward of the Little Rhône. The 5-fathom curve of sounding is nearly 1 mile from the shore, with a fine sandy bottom, and there are from 8 to 13 fathoms, mud, at 2 miles. At $1\frac{1}{4}$ miles eastward of the Grau d'Orgon is the small village of Saintes Maries and some fishermen's houses on the beach, which serve to assist in recognizing this very low coast.

Life-saving stations.—Gun life-saving apparatus is kept at Grau d'Orgon and Saintes Maries.

Gulf of Saintes Maries.—At $8\frac{1}{2}$ miles to the southeast of the Grau d'Orgon is Beauduc or Tignes Point, low, rounded and projecting westward; a beacon colored black is situated on its extreme point, which is steep-to. The point is advancing westward at about the same rate as Espiguette Point. Passing Beauduc Point, Faraman Light should be kept bearing northward of 77° . Between the Grau d'Orgon and Beauduc, a low sandy beach curving to the eastward and southward forms the shores of the Gulf of Saintes Maries, the land in the vicinity being low and marshy. At the head of the gulf is a large lake; on the eastern side is the anchorage of Beauduc, sheltered from northerly winds round by east to southeast.

Lights.—A flashing white and green light is exhibited, at an elevation of 57 feet above the sea, from a lighthouse constructed of masonry and painted white, 51 feet high, situated at la Gacholle, at the head of the Gulf of Saintes Maries. The white light should be seen 12 miles and the green light 10 miles. (For sectors see Light List and Chart.)

A group flashing red light is exhibited, at an elevation of 84 feet above the sea, from a lighthouse constructed of masonry, 82 feet high, with detached dwelling, erected on the sand dunes in the neighborhood of Beauduc Point. The light is visible 16 miles.

Beacon.—A black wooden pyramidal beacon, surmounted by a metal disc, is situated on the western extremity of the point.

Fog signal.—A fog signal is established at this lighthouse. (See Light List.)

Anchorage may be had in from 6 to 8 fathoms, sand and mud, good holding ground, 2 miles northward of Beauduc Point and $1\frac{1}{2}$ miles from the shore, but it should be abandoned with southerly and westerly winds. Small vessels anchor closer inshore, where there is more shelter in about 4 fathoms.

During strong easterly and southeasterly winds the weather is very thick, and the coast is often obscured; the constant use of the lead is then necessary.

At night, from the eastward, steer westward until in the *white* sector of la Gacholle Light, when steer toward the light; when Faraman Light bears about 110° , steer eastward, and anchor with la Gacholle Light bearing 14° , on the line dividing the *white* and *green* sectors, in about 6 fathoms water.

Vieux Rhône.—From Beauduc Point the low, sandy, and dangerous shore curves to the southeast and eastward to the mouth of the Vieux Rhône, a distance of nearly 5 miles. The entrance to the Vieux Rhône is shallow and only available for small coasting vessels. A customhouse and ruined tower are situated on the right bank at 2 miles from the entrance. The land between Beauduc Point and Vieux Rhône is low and marshy, forming several étangs or lakes.

Faraman Light.—A group flashing white light is exhibited, at an elevation of 133 feet above high water, from a lighthouse constructed of masonry and painted white, situated about 1,300 yards 24° from the old lighthouse on the left bank of the Vieux Rhône. It should be visible 17 miles.

Semaphore.—There is a semaphore station $1\frac{1}{2}$ miles 74° from the old lighthouse.

Saintes Maries.—A radio station is established at Saintes Maries; it is open to the general public both by day and by night, the call letters being F. F. S. The masts at the station are good marks.

Life-saving stations.—A gun life-saving apparatus is kept at Vignoble and Piémanson.

Coast.—From Vieux Rhône the same low sandy coast backed by marshy land continues to the eastward for about a distance of 10 miles to the mouth of the southeast or main branch of the River Rhône, and from Espiguette Point the 5-fathom curve is from less than $\frac{1}{2}$ to 1 mile from the beach; the use of the lead is essential in approaching these low shores, which are annually the scene of many shipwrecks.

The water in the approach to the Grau du Roustan has shoaled, depths of 3 and 5 feet having been found respectively inside and outside the 3-fathom curve, and a shoal with a depth of 2 fathoms over it is situated in latitude $43^{\circ} 20' 10''$ N., longitude $4^{\circ} 50' 0''$ E. Until a survey is made of this locality vessels should keep the tower on Cape Méjean open southward of Cape Couronne Lighthouse.

The River Rhône rises in the Pennine Alps, traverses portions of Switzerland and France, and after a course of nearly 600 miles, enters the sea by several mouths. At the town of Arles, on the left bank, about 25 miles from the sea, the river divides into two branches, one flowing to the southeast, the other pursuing a southwest course, together inclosing the alluvial island of Carmargue. The southeast or main branch is again divided, a short distance above its mouth, by low marshy islets, between which vessels of light draft enter the river. The Rhône is full of sand banks, which, owing to the strength of the current, are continually shifting, and vessels drawing more than 2 feet can not navigate with safety. Though its commercial utility is not at all proportioned to its length and volume, the Rhône is a noble river, and its scenery is very striking. The current brings down a whitish sediment, discoloring the sea to a distance of 6 or 7 miles, and there is every reason to suppose that there has been a constant though slow advance of the delta for the last 18 centuries. As an instance of this the tower of St. Louis was built in 1737 at $1\frac{1}{2}$ miles from the sea; it is now 5 miles from it. At about $\frac{3}{4}$ mile from the shore the fresh water of the river has been known to be 3 feet deep, and vessels have obtained fresh water from it.

Bar.—In 1887 the 5-fathom curve off the mouth of the River Rhône was 120 miles from St. Louis tower, the depths decreasing suddenly to 6 and 4 feet over the banks forming the bar; increasing gradually within the banks, where there are depths of $4\frac{1}{2}$ to 5 fathoms $3\frac{1}{2}$ miles from St. Louis.

In 1898 the shoals at the mouth of the Rhône were extending seaward, especially in their southeast part, the 3-fathom edge being nearly out to the southern limit of the red sector of light shown from Fort Bouc Lighthouse, or with that light bearing 40° .

Vessels rounding the shoals to enter the Gulf of Foz should not bring Fort Bouc Light to bear eastward of 35° until the lighthouse on St. Louis Canal South Jetty bears 298° ; this bearing is the southern limit of visibility of the light.

The shoals at the mouth of the Rhône have also extended in a northeast direction, and to avoid depths of less than 3 fathoms, when passing that edge of the shoals, vessels should keep the light at the entrance of St. Louis Canal in sight.

The low marshy land forming the banks of the river at the entrance is supported on the north side of a dam about $\frac{1}{2}$ mile in length, projecting in a 111° direction, and on the southern side by a dam twice that length, and then embankments to St. Louis.

At about 400 yards 33° from the extreme northern dam is the low sandy islet of They de l'Annibal, and to the northwest of it, for about 1 mile, those of Pegoulier, Tartane, and Mort, the two latter being connected with the northern embankment, and outside the dam the low islets of They de la Balancelle extend about east by south 1 mile 89° ; near here, at $2\frac{1}{2}$ miles from St. Louis, is a pilot flagstaff and a few cottages.

The sea breaks heavily on the bar with winds from the offing.

Signal.—When the bar is impracticable the pilots hoist a blue pendant half-mast, and to the masthead when the bar is safe.

Caution.—As the sands at the mouth of the Rhône often shift, and low, sandy islets are in formation, no stranger should attempt to enter without a pilot.

Discoloration of the water.—On approaching the mouth of the river the discoloration of the water will serve as a guide. At a moderate distance from the land the sea is whitish, becoming very dark as the coast is neared, and yellowish in its immediate vicinity. These streams generally trend to the southward.

Marks.—La Tour St. Louis, 92 feet high, square, and surmounted by a stone turret, on the north bank of the river, about 5 miles within the entrance; a large crane at Port St. Louis; and some large buildings (flour mills), several stories high, on the northern side of Canal St. Louis and a little eastward of the port, are conspicuous.

Soundings.—At 5 miles southward of the mouths of the Rhône there are about 50 fathoms water, mud bottom; at 3 miles, 40 to 45 fathoms; at $1\frac{1}{2}$ miles, 28 to 30 fathoms; inside this distance the water has shoaled. With southerly winds the currents are dangerous and set toward the coast, and many vessels have in consequence been wrecked.

Caution.—Vessels should never enter the discolored water of the Rhône.

The Gulf of Foz, formed between the mouths of the Rhône and Cape Couronne, is from 4 to 5 miles in breadth and 6 miles deep, with 33 fathoms water in the middle of the entrance, and 6 fathoms at $1\frac{1}{2}$ miles from the beach at its head. The small town of Foz, from which the gulf takes its name, stands on an eminence, on the shore of a lake, $8\frac{1}{4}$ miles north-northwestward of Cape Couronne. Between the mouths of the Rhône and the town of Foz, the land is exceedingly low and marshy, with several lakes having two outlets to the sea. The head of the gulf should not be approached within 1 mile; the gulf is exposed to winds from the southward.

Anchorage can be obtained anywhere at the head of the gulf, over $\frac{1}{2}$ mile from the shore, but the Plateau de Roche du Grand Forté, about 2 miles westward of the square tower of Bouc, which has from 8 to 10 fathoms water, should be avoided; the plateau is now, however, covered with mud.

The best anchorage is in Anse du Repos off the entrance to St. Louis Canal, in 5 fathoms, mud, with the southern mole lighthouse, bearing 250° distant about 1,400 yards; here vessels are safe as the holding ground is good, and although open to southeasterly winds there is less sea than in other parts of the gulf; small vessels anchor about $\frac{1}{4}$ mile northward of the lighthouse. Aigue Douce anchorage is on the eastern side of the gulf between the low an white Pointe de Beau Massais and Cap d'Aiguades, or d'Aigue Douce, on which is the old signal station of Bouc; here vessels anchor in about $4\frac{1}{2}$ fathoms, sandy mud and weed, with the old signal station bearing between 135° and 158° , avoiding a shoal with $1\frac{1}{4}$ fathoms water, about 600 yards northwestward of Cap d'Aiguades. This anchorage should be quitted on southwesterly or westerly winds setting in, as the sea then becomes very heavy and it may not be possible to get under way.

There is anchorage for vessels waiting to enter the canal about 100 to 150 yards northward of the outer buoy.

Pilotage.—There are a number of pilots at the St. Louis Canal pilot station; they pilot vessels from the sea to Port St. Louis du Rhône, by the canal and by Le Rhône, and also direct the movement of vessels in the inner basins of Port St. Louis.

St. Louis Canal, about 3 miles northward of the mouth of the river, is a ship canal through which all vessels enter and leave the Rhône; it runs through salt lakes and marshy land in the direction of the tower of St. Louis, and is 3,718 yards long, 98 feet width of floor, 207 feet wide at surface, and has a depth of $19\frac{1}{2}$ feet. At St. Louis it connects with a rectangular basin 443 yards by 330 yards, which also communicates with the river Rhône by means of a lock, 175 yards long, 24 yards wide, and $24\frac{1}{2}$ feet deep; the basin will receive vessels of 18 feet draft. The banks of the canal are protected

by masonry $4\frac{1}{2}$ feet above low-water level. The entrance is between two piers forming the outer port, the southern extending eastward 1,640 yards; the northern pier, in an unfinished state, is 1,422 yards to the northeastward of it, and curving in the direction of the south pier head; between the two a depth of $19\frac{1}{2}$ feet is maintained.

The dredged channel of $19\frac{1}{2}$ feet is along the south pier at a distance of 22 yards, keeping the tower of St. Louis on with the middle of the canal. There is a daily service of steamers from St. Louis to the town of Arles, about 20 miles up the river.

Buoys.—At the eastern entrance to the St. Louis Canal in the Gulf of Foz, are two red buoys, which are left to starboard when entering; a third red buoy is moored farther outward; vessels drawing $14\frac{1}{2}$ feet can pass it on either side. Vessels which, owing to an unfavorable wind, do not run into the canal, can anchor about 110 to 165 yards northward of this buoy in $2\frac{1}{2}$ fathoms, blue clay.

Trade.—The chief imports are coal, grain, oils, and phosphates, and the chief exports are cement, lime, grain, flour, oils, and zinc.

Communications.—There is a daily service of steamers from St. Louis to Arles, a town about 20 miles up the river.

Life-saving station.—A whale boat is maintained in Port St. Louis, and will be towed out to a vessel in distress. A rocket apparatus is kept at the customhouse.

Pilots.—Vessels requiring a pilot for Canal St. Louis hoist at the foremast head, under the pilot flag, their national flag, house flag, or any other flag. The second flag is the special signal for calling a canal pilot.

Light.—A fixed white light is exhibited, at an elevation of 43 feet above the sea, from a brown iron turret erected on the outer end of the southern pier, visible in clear weather from a distance of 11 miles. The light is obscured in the direction of the shoals off the river Rhône; the light therefore should be kept in sight. (For obscured sector, see Light List and Chart.)

Cape d'Aiguades, $2\frac{1}{2}$ miles southward of Foz, projects to the westward, and has a shoal of $1\frac{1}{2}$ fathoms about $\frac{1}{4}$ mile northwestward of it.

Port Bouc, at nearly $\frac{1}{2}$ mile southeastward of Cape d'Aiguades, is formed by a low point from which a mole curves southward and eastward about 400 yards, and affords convenient shelter for small vessels unable to reach Marseille during contrary winds; it is situated at the outlet of the Étang de Berre, an extensive lake with a depth of 5 fathoms, lying 3 miles to the northeast of Port Bouc. The shore between Foz and Bouc is somewhat higher than that to the westward, and is rocky.

The southern side of the entrance to the port is formed by an islet, the sandy tongue of which is connected to the shore by a bridge. On the northwestern point of the islet is a fort and the Tower of Bouc,

the latter, being a white square tower, may be seen at some distance. The entrance to the port is 200 yards wide, but a shoal named the Tasques, on which the sea breaks in bad weather, extends 200 yards southward from the elbow of the mole, with 12 and 18 feet water on it. The passage between the tail of this shoal and the southern lighthouse has from 30 feet at the entrance to 22 feet, 150 yards eastward of the mole head; farther in there are 24, 19, 15, 12, and 6 feet water.

Buoys.—Two white buoys moored in 26 and 23 feet mark the direction of the entrance, a white buoy in 16 feet marks the edge of the east bank within the port, and another white buoy marks the west side of the entrance to Basin Aubran.

The village of Bouc is about $\frac{1}{2}$ mile northward of the mole head, and just to the eastward of the village is the entrance of the canal leading to Arles, a coal wharf and the Basin Aubran, 820 feet long and 360 feet wide, with depths from $14\frac{1}{4}$ to 16 feet. About $\frac{1}{2}$ mile within the port there are several sand banks formed into salines or salt works, with narrow channels between them leading to the town of Martigues at the entrance to Lake Berre; of these the principal, through which small vessels pass, is the Canal Maritime de Martigues to the northward, with depths of $16\frac{1}{2}$ to $19\frac{1}{2}$ feet.

Dolphins.—Two dolphins are established northward of Pointe de la Lèque Jetty Light.

One of these dolphins is located 601 yards 5° and the other 612 yards 11° from the light.

Beacons.—Two mast beacons on the north shore kept in range, or the lighthouse on the mole in range with a black beacon on the inner side of the round point of the mole, lead to the entrance of the canal.

The town of Martigues lies about 3 miles east from the entrance of the canal; the population is engaged much in fishing and boat building. The Étang de Berre here expands into an extensive sheet of water, being about 10 miles in length and 8 in width. There are several small towns round the northern and eastern shores.

Landing.—The landing place is indicated by a flagstaff at the village of La Lèque on the west side of the port, but there is scarcely enough depth of water for a vessel's boat.

Supplies and water can be obtained from Martigues.

Communication.—Both the towns of Bouc and Martigues have railroad communication with Lyon and Marseille.

Tides.—A rise of 2 feet above the ordinary level has been observed in the months of October, November, and December, and a fall of $1\frac{1}{4}$ feet in the month of February.

Lights.—A fixed white unwatched light, visible 8 miles, is exhibited at 49 feet above the sea from a round white tower on the head of the mole forming the northern side of the entrance to Bouc.

A fixed light with red and green sectors is exhibited from a square white tower with round turret in the fort on the southern side of the entrance, 95 feet above the sea. The white and red sectors will be visible 15 miles, and the green 14 miles. (For sectors see Light List and Chart.)

Pilots.—If the weather is moderate, pilots will be found off the port.

The pilots of Marseille perform the pilotage service at Port de Bouc, and a pilot boat is stationed at Bouc.

Life-saving station.—A gun life-saving apparatus is established at Bouc.

Directions.—A vessel's position will be known at a distance by Mount Ste. Victorie (3,182 feet high), which appears isolated, and bears 73° nearly 30 miles from the entrance to Bouc. On nearing the land the town of Foz will be seen on a hill, like an islet, with moderate high undulating land eastward of it; then the large white square Tower of Bouc; and, finally, the fort; at night the two lights. To enter the port, steer in with Notre Dame de Miséricorde Chapel on a hill, 351 feet high, about 3 miles eastward of Bouc Village, just open northward of Fort de Bouc light-tower, until about 200 yards distant, to clear les Tasques; then pass on either side of the two white buoys in the entrance, and leave the inner white buoy on the starboard hand, when turn northward into the port.

For Canal de Martigues, when in the port, keep the rear beacon on the shore of Bassin Aubran well open westward of the front beacon, until Chauvet old mill is open its own width northward of the customhouse eastward of Bassin Aubran. With northeast and easterly winds, especially in February and May, a strong current sets out of the port from Étang de Berre. A vessel unable to enter during strong offshore winds can anchor in Aigue Douce anchorage.

Cape Couronne, called also Riche Point, is the eastern extremity of the Gulf of Foz. The cape is low, and projects to the southward, with a reef extending 100 yards from it. Between Bouc and the cape the land is undulating, and much higher than that to the northwest; several small bays on the coast are used by fishing boats in fine weather. Mount Tabouret, a hill 485 feet high, rises 2½ miles to the northeastward of the cape. On the western side of the cape are the two bays of Carro and Verdon, separated by a rocky point; in Carro is the village of that name; a small pier is situated at the entrance; at the head of Verdon there is also a village, and both bays are used by coasting vessels during offshore winds.

Lifeboat.—A lifeboat is stationed at Carro.

Carro—Light.—A fixed white light, elevated 27 feet above the sea, and visible 8 miles is shown from a white iron column, 18 feet in height, situated at the end of the pier. (See Light List.)

Ragues d'Arnette Shoals.—At 1 mile westward of Cape Couronne, and about $\frac{1}{2}$ mile from the coast, are the Ragues d'Arnette, with 7 and 9 feet water on them, and on which the sea nearly always breaks. About $\frac{3}{4}$ mile from the shore, between Bouc and Cape Couronne, there are 11, 16, and 20 fathoms.

Clearing marks.—Port de Bouc Mole lighthouse open westward of Fort de Bouc leads westward of Les Ragues d'Arnette and de Carro, and Château Gabriel, on a hill westward of Sausset, in bearing with Cape Couronne Lighthouse, range 79° , leads southward.

The shoal banks off the coast between Bouc and Cape Couronne are covered by the *green* sector of Tour du Fort Light.

Light.—A flashing red light, visible 12 miles, is exhibited at an elevation of 55 feet above the sea from a square white tower 38 feet high, erected on the extremity of Cape Couronne. The light is not visible in the Gulf of Foz when bearing to the southward of 126° . (See Light.List.)

Semaphore.—A semaphore, white house and tower, is in use $\frac{1}{2}$ mile northward of Cape Couronne.

Aragnon Islet, lying $1\frac{1}{4}$ miles eastward of the cape and 300 yards from the shore, is low, and has about 1 fathom water between it and the land. Between the islet and the cape the coast forms a small bay named Port St. Croix, which is only convenient for coasting vessels which, during winds from the northward, anchor in $3\frac{1}{2}$ fathoms.

Tunny fisheries are established off Aragon Islet.

Measured distance.—A measured base in two sections for testing the speed of vessels extends from off Cape Couronne in an easterly direction to northward of the western end of Ratoneau Island; its direction is defined by the dome of Marseille Cathedral seen between the two spires of the Protestant church (St. Vincent de Paul), 94° is the range mark.

The western limit is marked by the alignment of the semaphore with the lighthouse on Cape Couronne. The eastern limit is marked by the alignment of the new semaphore of Pomègues with a triangular pyramidal beacon, painted in black and white horizontal bands, on the western part of Ratoneau Island. The division of the base is marked by the alignment of the northeast corner of the chateau of Carry or Chateau Jourde (a large house with red roof, the highest in Carry village) with a beacon, consisting of a truncated conical turret, painted in black and white horizontal bands and with a round white topmark, standing on the western entrance point of Port Carry.

The length of the western (Cape Couronne-Carry) section is 26,489 feet; that of the eastern (Carry-Pomègues Ratoneau) section is 38,381 feet, and the total length of the base is 64,870 feet.

The coast from Cape Couronne trends eastward nearly 8 miles to Cape Méjean; it is low and arid, rising gradually, and between Sausset and Port de Rouet is covered with pine trees; eastward of Carry it is a line of broken and irregular cliffs, which attains its greatest height at Cape Méjean. Eastward to the vicinity of Cape Méjean, the coast is bordered with rocks which extend about $\frac{1}{2}$ mile off it; from this distance the bottom is weed and gray sand to $\frac{1}{2}$ mile offshore; it is then muddy sand, and at the distance of about 1 mile the depths are over 22 fathoms, mud bottom. The depths rapidly increase toward Cape Méjean.

Île Aragon, $1\frac{1}{2}$ miles eastward of Cape Couronne, and 250 yards from the coast, is low and black; the passage inside it should not be used for navigation. A patch with 2 fathoms water lies about 200 yards southwestward of the islet, and there is a depth of 9 fathoms about 300 yards southward of it. Midway between the islet and Cape Couronne is Port de Sainte Croix, a little bay used by small vessels with off-shore winds. Calanque du Petit Nid and Anse de Boumandariel, two small bays, are separated by Île Aragon; in the latter of these bays small vessels obtain shelter with north-westerly winds, and the holding ground is good.

Port de Sausset, $1\frac{1}{2}$ miles eastward of Île Aragon, is frequented by fishing boats, which shelter under a small jetty. There are a number of houses and villas at the head of the port, and Château Gabriel, westward of it, is surmounted by a bell tower.

Tunny fishery.—Tunny nets are sometimes laid out off Île Aragon.

Port de Carry, 2 miles eastward of Sausset, is suitable for small vessels; the entrance lies between the cliffy Pointe du Mouton, on which is an old mill (beacon), and which is bordered by low rocks on the westward, and a shoal, on which is a red masonry beacon, surmounted by a red triangle on a pillar, 12 feet high, named L'Esteo, or L'Âne, on the east. There is a boat harbor inside a rocky mole about 100 yards long, at the head of the port.

Anchorage.—There is anchorage on the coast between Cape Couronne and Port de Carry, about $\frac{1}{2}$ mile off-shore, vessels at anchor being ready to weigh on winds setting in from seaward. The most frequented anchorage is about $\frac{1}{2}$ mile southward of the entrance to Port de Carry, where large vessels shelter from northwesterly winds in 6 to 8 fathoms, weed. Do not anchor on Plaine de Carry, a rocky bank, with 13 fathoms least water, about 1 mile southward of Port de Carry.

Pilots.—Port de Carry is a station for Marseille pilots.

Cape Méjean, $7\frac{1}{2}$ miles 92° from Cape Couronne, is 500 feet high, steep, and has an old tower on it. Between Carry and Cape Méjean are Port de Rouet and Port de Gignac, used by fishing

or small vessels with off-shore winds. Carry is midway between the islet of Aragnon and the cape, and there are various small coves along this part of the coast. The low coast, backed by forests, continues from Cape Couronne as far as Carry, when it becomes higher; it is clear of danger at a little more than 200 yards distant.

Tunny fishery.—This coast is frequented at times by tunny fish, and caution is necessary to avoid the nets (*madragues*), which are moored at about 1 mile from the shore.

Carry Bank.—A bank of 13 fathoms, rock, lies nearly 1 mile southward of the western point of Port Carry.

Life-saving station.—A gun life-saving apparatus is established at Carry and Méjean.

Pilots.—The port of Méjean is a station for Marseille pilots.

Port de Méjean, between the cape and Point de la Loude, which has several rocks off it, is 300 yards in length, with depths of from $2\frac{1}{2}$ to $3\frac{1}{2}$ fathoms, but it is sheltered except from winds between southwest and southeast, which raise a heavy sea and make the entrance very dangerous.

L'Estaque Road.—From Cape Méjean, the western extremity of the Bay of Marseille, the coast trends eastward to Niolon Point, and is high, steep, and clear of danger. At $\frac{1}{2}$ mile from the cape is the islet of Arapégue, close to the land. The small Bay of Niolon, westward of Niolon Point, is of no importance. From Niolon Point the shore continues eastward for $2\frac{1}{2}$ miles; it then curves to the southward and forms l'Estaque Road; it is high and bold-to, especially as far as the point and battery of Corbiere, which is $1\frac{1}{2}$ miles from Niolon Point. The water then becomes shallower, and at $\frac{1}{2}$ mile eastward of the battery there are 7 fathoms, mud and weed, and 4 fathoms at 400 yards from the shore. L'Estaque Road is much frequented, though open to the southward and westward, as the highland deadens the onshore winds. The anchorage is 600 or 800 yards to the southeastward of Corbiere Battery, with the center of Ratoneau Island bearing $170^{\circ} 30'$ or in a line between Corbiere Point and Marseille, in about 10 fathoms.

Life-saving station.—A rocket apparatus is stationed at Port de l'Estaque.

Saumaty Bay—Lightbuoy.—A black lightbuoy showing a fixed red light, visible 5 miles, is moored on the prolongation of the dike of the Marseille-Rhône Canal, which is being extended toward Marseille between the port of Estaque and Saumaty Bay, and 22 yards from its extremity.

This buoy will be moved from time to time as the work advances, so that it will always be approximately 22 yards in advance of the enrockment.

Port de la Lave—Canal de Marseille au Rhône.—About 800 yards eastward of Pointe de la Corbiere is the commencement of the breakwater, which shelters Canal de Marseille au Rhône; it extends, from 200 to 400 yards off-shore, southeastward to Cape Janet, and there are three entrances—one off Port de la Lave, one southward of Port de l'Estaque, and the third off Pointe de Mourrepiane. The canal is to be from 150 to 200 feet wide and 8 feet deep.

Inside the breakwater are the small ports, within moles, of La Lave, L'Estaque, Fontaine des Tuiles (Anse Saumaty), and Mourrepiane. Anse Martin lies between Pointe de Mourrepiane and Saut de Marrot, and extensive works are projected in it.

Lights—Port de la Lave.—A light is exhibited, at 39 feet above high water, from a black-metal apparatus on a masonry base, 33 feet high, on the eastern end of the breakwater at the entrance to the port.

Port de l'Estaque.—A light is exhibited, at 29 feet above high water, from a black-metal turret on a stone base, 25 feet high, on the southeastern end of the breakwater southward of Port de l'Estaque.

Saut de Marrot.—A light is exhibited, at 108 feet above high water, from a round tower with a dwelling, 19 feet high, on the cliffs of Saut de Marrot.

The light is visible 16 miles. (For sectors see Light List and Chart.)

Coast.—From l'Estaque the shore trends to the southeast to the Point and Battery of Mourrepiane, distant about $\frac{3}{4}$ mile; about $\frac{3}{4}$ mile farther to the southward is Saut de Marrot and $\frac{1}{2}$ mile farther on is Cape Janet.

Cape Janet is a yellowish point about 131 feet high; on its summit are a chapel and a glass factory with a chimney, partially obscured by trees; about 800 yards northeastward is a large seminary.

Life-saving station.—A mortar life-saving apparatus is established at Mourrepiane.

Cape Pinede, $\frac{3}{4}$ mile southward of Cape Janet, has on it a battery, the shore between forming a bight, with rocks above water extending 600 yards from the shore. Both capes are moderately high, and surrounded by reefs which extend off a short distance. A little northward of Cape Pinede is the commencement of the extensive basins forming the port of Marseille, and at $1\frac{1}{2}$ miles southward is the roadstead and south entrance to the port. From Corbiere Point round to Marseille a vessel should not stand into less than 6 fathoms water a short $\frac{1}{2}$ mile from the shore.

Marseille (ancient Massilia) is the largest emporium and most important commercial seaport city of France; it is beautifully situated and is environed by lofty precipitous hills, the space between

being studded with villas and hamlets. The country around is, however, extremely arid, and the northwest wind (mistral) is blighting and noxious in the extreme. The city is built round the port, and is divided into two parts, the old and new town; the former, occupying the site of the ancient Greek city, on rising ground at the north side of the harbor, is confined, ill built, and has narrow streets. The latter is of modern style, with regular streets and handsome squares and houses, and stands on the south and east sides of the port. Many of the streets are planted with trees, especially that running from the Arc de Triomphe to the hippodrome, a distance of above 3 miles, in which are fountains, statues, and an obelisk; but the favorite public promenade is the Rue Cannebière, a fine broad street at right angles to the former and leading to the inner part of the harbor. There are numerous handsome public buildings, particularly the cathedral, Hotel de Ville, and palace; also public libraries, including one for seamen (La Conception Hospital), a museum, zoological gardens, etc. The population in 1911 was 554,934.

Marseille was founded by the Phocæans from Asia Minor 600 years B. C., and long retained its liberty as an independent Republic; it was united to the Crown of France in 1841 by Louis XI.

Trade.—The chief manufactures are soap, sugar, oil, oilcake, and glass, and there are lead-smelting, steam-engineering, and sulphur works. In the neighborhood are large lignite mines and stone quarries.

The chief imports were cattle, coal, coffee, cotton, fruit, hides, metals, oils, oil seeds and nuts, sugar, dried vegetables, wheat, and wood.

The chief exports consisted of barley, brandy, bauxite, cement, coal, groundnuts, hides, potatoes, oil, soap, sugar, tiles, wines, and liquors.

Population.—According to the census of 1911, the population of Marseille exceeds 540,000.

Harbor regulations.—Steamers entering or leaving must have a lookout man stationed on the foremast, to report any movements of vessels in the roads, Avant Port Sud, or Jolietta Basin. The signal for a tug is a white flag at the yardarm.

Vessels carrying mails leaving the port have precedence of other vessels.

By day: Every steamer must announce her departure, 15 minutes before casting off, by a long blast followed by two short blasts of the whistle; at the same time she will hoist the mail or company's flag.

If a vessel can not leave at her fixed time she will lower her flag and give one blast of the whistle.

If the master does not comply with this order, the service of the port will hoist at the yardarm of the signal mast the flag of the next

vessel to leave; then after the second vessel has left, the first vessel must leave, within 15 minutes, assisted, if necessary, by a tug.

At night: Every vessel entering Bassin de la Joliette must hoist, on passing Joliette Light, a *white* light over *two red* lights, placed vertically 3 feet apart, and at least 20 feet above the bridge; these lights must be lowered as soon as Passe de la Major is cleared.

Every steamer must announce her departure, 15 minutes before casting off, by a long blast followed by two short blasts of the whistle, and at the same time she will hoist the three lights which are hoisted on passing Joliette Light.

If a vessel is delayed she will lower the lights and give one blast of the whistle.

A vessel entering or leaving by day or night must keep at least 400 yards from the preceding vessel, so as to have the vessel under control, should the leading vessel have to stop. In this case the leading vessel should whistle and use her siren continuously until danger of collision has passed.

The rule of the road is always to be followed.

Every steamer making any movement whatever in Joliette Basin must take one or more tugs if the service of the port so order, in view of a steamer entering or leaving.

In the basins and l'Avant ports steamers must proceed at as slow a speed as the weather and circumstances require.

A vessel must not pass and cross ahead of another.

The swing bridge in Traverse de l'Abattoir is opened by day or night on request by a vessel desiring to go through; vessels from National Basin use the western channel, and those from Maritime Basin, the eastern channel.

Explosives and petroleum.—Vessels loaded with explosives and petrol are berthed in Pétrole Basin, in the northeastern part of Pinède Basin. The total weight of explosives on board a vessel entering or leaving must not exceed 45 tons, and should the cargo include dynamite, melinite, crystalite, picric acid, or analogous explosives, three times their weight is counted for the total maximum. Chinese crackers and fireworks are deemed explosives, and vessels with more than 1 ton on board are berthed in Pétrole Basin; vessels having less than 1 ton on board will be provided by the service of the port with a special watchman during their stay in port.

Vessels arriving wholly or partially loaded with petrol or other inflammable matter must use Pétrole Basin, and also vessels embarking more than 2,200 gallons. The shipment of smaller quantities may be authorized by the service of the port in other places, but while it is being performed all scupper and port holes are to be tightly closed. For other regulations for landing and embarking explosives and inflammable matter, see Port regulations.

The Vieux Port (Old Basin) is a fine natural basin, stretching to the eastward into the center of the city. It is 2,920 feet long, 982 feet average width, with an area of 65 acres, and a depth varying from 19 feet 8 inches to 24 feet 8 inches at the entrance, so that it is suitable for a large number of vessels of moderate size. This port, which has an entrance of about 230 feet between the forts, is chiefly reserved for sailing vessels drawing less than 18 feet, yachts, and tugs. It is surrounded on all sides by spacious quays, and the entrance is defended on the north by Fort St. Jean and on the south by Fort St. Nicholas.

On the south side, just within the entrance, is a careening basin, and at the east extremity of the south quay are two entrances to a canal spanned by swing bridges. Here small craft and barges are secured for discharging.

Vessels make fast to the quays to load and discharge cargo; those awaiting their turn are secured in tiers, leaving a passage in the middle from the entrance to the Quay la Cannbière.

The Old Basin is to be improved by being deepened to a depth of 24 feet 7 inches, with 26 feet 3 inches at the entrance; the quays are to be enlarged, and it is to be connected with the Joliette Basin by rail.

A red beacon 20 feet high, surmounted by two disks and a flag, is situated close to the outer end of the jetty east of Pharo Point Light-house, on the south side of entrance to the Old Basin.

A transporter bridge, 164 feet high, has been constructed at the entrance to Port Vieux.

In addition to the Old Port, a breakwater extends to the northward along the front of the city, which when completed will be over 3 miles long, forming within the following basins:

The Joliette Basin, entered on the south from the South Outer Port, between piers (the traverse de la Major) about 230 feet apart, is 1,623 feet long, has an average width of 1,287 feet, with an area of 48 acres, depth at entrance $26\frac{1}{2}$ feet, and over the basin of from $15\frac{1}{2}$ to $39\frac{1}{2}$ feet water. This basin is chiefly appropriated to steamers and is connected with the Old Port by a canal running behind Fort St. Jean carrying 16 feet depth of water, which is also adapted for a dry dock.

The Lazaret and d'Arenc basins, the next northward, and communicating with the Joliette, from which they are separated by the mole or traverse de la Joliette (on which is the chief port office), are excavated on the site of the once famous Lazaret and have together a total length of 2,460 feet and from 755 to 1,578 feet in width, with an area of 39 acres, width at entrance 69 feet, and depth over sill 28 feet; and is crossed by two swing-bridges. A railroad goods depot, large warehouses, and bonded stores line the quays.

The Lazaret mole extends into the Lazaret and d'Arenc basins.

The Maritime Basin, 1,200 feet long, 1,716 feet wide, and at entrance 164 feet, depth over sill $39\frac{1}{2}$ feet, with an area of 41 acres, is next north of d'Arenc Basin, separated from it by the mole d'Arenc, and has depths over it of from $19\frac{1}{2}$ to 49 feet; it communicates northward with the National Basin, from which it is separated by the Traverse de l'Abattoir, which is spanned by a swing bridge on a central pier, forming two passes, 98 feet wide, with a depth of 31 feet.

The National Basin is 3,035 feet in length, width 1,685 feet, with an area of 100 acres, the width at the southern entrances being 98 feet, and depth on sills 31 feet. It has depths over it of from $19\frac{1}{2}$ to 65 feet, and communicates through a channel 91 feet wide, with a depth of $26\frac{1}{2}$ feet, with an inner basin to the eastward, leading to several dry docks, capable of accommodating the largest class of vessels. The basins are surrounded by quays, upon some of which are ranges of handsome warehouses built entirely of stone and iron, fitted with hydraulic lifts, and adapted for the storage of an immense amount of merchandise. The National Basin communicates northward with the Pinède Basin, from which it is separated by the mole or Traverse de la Pinède, width at this entrance being 343 feet, and depth in channel of from $41\frac{1}{2}$ to $52\frac{1}{2}$ feet.

The Pinède Basin adjoins National Basin.

The greatest depth of water in the several basins will be found at the exterior jetties and diminish towards the east. They are connected together in the order named commencing from the southward. The widths of entrances and depths over sills are for the southern entrances.

Madrague Basin, entered from Pinède Basin, through the Traverse de la Madrague, occupies the position of the former Northern Outer Port. It has a depth of 36 feet in the entrance and alongside the quay, and an entrance on the northeastern side into Canal Basin, the southern approach to the Marseille-Rhône Canal.

Canal.—A canal connecting Madrague Basin with Arles on the River Rhône is in course of construction.

From the northern part of that basin it will extend in a direct line to Martin Cove, and then follow the coastline to Lave Point in L'Estaque Road.

This canal (which will put Marseille in communication with the other navigable canals in the south of France) will have a depth of 8 feet, and be from 150 feet to 200 feet in width.

Lightbuoys.—A red lightbuoy, exhibiting a fixed green light, is moored off the northwestern end of the works in progress for the extension of the outer wall of the new Mirabeau Basin, and in the direction of its prolongation. The buoy will be moved to the northward as the work progresses.

The northern limit of the obscured arc of the occulting green light shown from the western side of the *Passe de la Madrague*, will be altered as the work progresses, so that it will mark the position of the above-mentioned lightbuoy.

NOTE.—This light is to be moved northwestward and reestablished at the bend in the breakwater.

A black lightbuoy showing a fixed red light is moored on the northeastern side of the pass northwestward of the occulting red light on the *Traverse du Cap Janet*.

A red lightbuoy is moored on the southwestern side of the pass opposite the above buoy.

These two buoys mark the limits of the Pass of Cap Janet, northern entrance to *Madrague Basin*. The buoys are provisional, depending on the works in progress.

Batteries.—On the breakwater abreast of the *Joliette Basin* are two batteries; abreast the *Maritime Basin* are two others, and there is another at the northern end of the *National Basin*.

Buoys.—In the Old Basin are three white mooring buoys, one off the customhouse and two at the entrance of the careening basin. In the South Outer Port is a white mooring buoy in $4\frac{1}{4}$ fathoms, 300 yards southward of *Joliette light tower*; this buoy should be left on the port hand on entering the Old Basin, and on the starboard hand on entering *Joliette Basin*. Two white mooring buoys are situated 100 yards and 200 yards, respectively, southward of the eastern molehead of the *Traverse de la Major*; these buoys should be left on the starboard hand when entering the *Joilette Basin*. Off the rocks at the foot of *St. Jean light tower* is a black buoy with topmark.

Lights—Tête de Maure.—On Point *Tête de Maure*, on the southern side of entrance to the Old Port or Basin, and about 300 yards westward of *Fort St. Jean* on the opposite side of the entrance, from a white turret, with main building, at an elevation of 62 feet above the sea, is exhibited an unwatched fixed white electric light, visible 13 miles.

Pharo Point.—From a white cylindrical masonry tower on *Pharo Point*, at an elevation of 40 feet above the sea, is exhibited a fixed green electric light, visible 11 miles.

Fort St. Jean.—At the foot of the tower of *Fort St. Jean*, on the northern side of entrance to the Old Port, at 30 feet above the sea, is exhibited from a white circular turret, a fixed white unwatched electric light, visible 10 miles.

Beacon.—*Roche Mangevin*, lying close westward of *Fort St. Jean*, is marked by a black cylindrical masonry beacon, surmounted by a black cylinder, 10 feet high.

Joliette Basin.—On the southern extremity of the breakwater, at the entrance to the *Basin de la Joilette*, is a white round tower,

with main building, which exhibits at 73 feet above the sea a fixed red electric light, visible 14 miles. (See Light List.)

Moleheads—Lights.—On each of the Traverse de la Major moleheads, entering Joliette Basin, are iron turrets, 18 feet in height and painted gray, from which are exhibited, at an elevation of 21 feet, a fixed green light on the eastern side and a fixed red light on the western side.

A fixed red light is shown from the molehead on each side of the Traverse de la Pinède.

Outer breakwater—Light.—On the bend of the outer breakwater, an unwatched occulting green light is exhibited at an elevation of 39 feet, from a tower of masonry, painted red; this light is visible 5 miles.

NOTE.—This light is to be moved in 1916, northwestward and re-established at the bend in the breakwater.

Madrague Pass—Lights.—A fixed green light is shown from the northeastern corner of the western pier.

A fixed red light is shown from the northwestern corner of the eastern pier.

These lights are each exhibited, at an elevation of 23 feet, from a lantern surmounting a reservoir, painted gray, and are visible 3 miles; they are unwatched.

Madrague—Light.—An unwatched occulting red light elevated 20 feet above the water and visible 8 miles is erected on the mole at Cap Janet, the Bassin de la Madrague.

The light is exhibited from a lantern surmounting an iron reservoir 15 feet high, painted black. (See Light List.)

Traverse de l'Abattoir.—A light is shown 6 feet from each end of the shore piers elevated 22 feet above the sea, and a light 7 feet from the edge of each side of central pier elevated 26 feet above the sea. The heights of the buildings are 13 and 19 feet, and the lights are visible from distances of 5 and 2 miles, respectively. The four lights are so placed that two lights are visible to those proceeding from the National Basin to the Maritime Basin and passing westward of central pier, and two lights are seen by those proceeding in the opposite direction and passing eastward of the central pier, in such a manner that if two white lights are seen the swing bridge is closed; when a white and red light are seen the bridge is swinging; and when two red lights are seen the pass is clear.

Buoy.—A gas buoy showing a fixed green light is moored off the extremity of the breakwater under construction in the north outer port.

Supplies and coal.—The water supply at Marseille is abundant and taken by pipes to the quays, or supplied from steam tank vessels. The water is bad for drinking; it should be filtered and

boiled. All requisite provisions and requirements for shipping can be readily obtained. Powerful tugs are to be found off the port. There is every facility for coaling rapidly, and both English, German, and native coal can be obtained, shipped from a wharf 500 feet long with a depth of 24 feet alongside, or from lighters with a capacity of from 100 to 250 tons. The coal is put on board by baskets aided by steam cranes. The Government keeps a stock of 87,000 tons of patent fuel, and 57,000 tons of coal are stocked by private firms. French coal is consigned to the Maritime Basin and English coal to the National Basin.

About 57,000 tons of coal are kept in stock by private firms.

Docks.—See Appendix I.

Repairs.—Large repairs to machinery can be executed by the *Compagnie des Forges et Chantiers de la Méditerranée*. Engines of 8,500 horsepower have been made, and all large castings for the vessels built in this company's yard at La Seyne, Toulon are executed at Marseille; as also for those built at La Ciotat by the *Compagnie des Messageries Maritimes*.

Pilots.—Pilotage is compulsory, and pilots cruise off the port in boats, which carry a blue flag with a white border by day, and exhibit a light every five minutes during the night. In moderate weather they are found off Planier Island.

The pilotage station of Marseille has 46 pilots and 12 assistants under the orders of a chief pilot. Pilot boats are stationed—one at Port de Bouc, two at Carry, two at Cap Caveaux, two near Île de Riou or Île Maire, and several at the entrance to the port.

Masters of vessels having any complaint to make regarding the pilotage must do so to the chief pilot with 48 hours of entry, after which no complaint can be received.

The pilotage offices are on the quay at the entrance to Port de la Joliette and on the North quay of Vieux Port.

Mooring.—Naval vessels moor in the National Basin with both anchors, and a stern line to a mooring buoy; anchor marking buoys should be unbent before letting go. Vessels are very skillfully handled by the pilots with the aid of small tugs, which belay their two lines to a bitt or turntable just abaft the funnel, about in the center of the boat instead of aft, enabling them to head in any direction even with a heavy pull on the line.

Communication.—Railroads and the electric telegraphs connect Marseille with all the capitals in Europe. French steamers run regularly to all the principal ports in the Mediterranean, the Archipelago, and Black Sea; to Australia, India, China, and Japan; the West Indies, Central America, West Coast of Africa, Mauritius, and Madagascar, etc., and the Peninsular and Oriental Company and other British lines to London.

Danish, Norwegian, and Swedish lines run to the Baltic, Scandinavian, and German ports; Spanish, Austrian, and Italian lines to the Spanish-Mediterranean and Black Sea ports; Dutch lines to the Dutch East Indies; an Italian line to Central America and the Pacific; and a Japanese line to Japan, London, and Antwerp.

The Messageries Maritime guarantee the following services: Two sailings per month for Yokohama; one sailing per month for Singapore, Saigon, and Haifong.

One sailing per month for Colombo, Batavia, Nouméa, Brisbane, and Sydney.

One sailing per month to Jibouti, Mombasa, Zanzibar, Mayotte, Réunion, and Mauritius; one sailing per month to Aden, Jibouti, Seychelles, Diégo-Suarez, Madagascar, Réunion, and Mauritius.

Consul.—The United States is represented by a consul general, consul, and vice consul.

Harbor signals.—The following signals for regulating the entry to, and exit from, Bassin de la Joliette and Vieux Port, are made from a mast on the western side of Traverse de la Major, at a horizontal arm terminated by a disc, with black balls by day, and with red and green lights at night. The horizontal arm points northwest and southeast; the balls and lights are placed vertically, 7 feet apart.

No signals at the mast by day or night indicate that vessels are free to move.

By day, the arm horizontal, or at night, three red lights vertical, signifies entrance prohibited.

By day, three balls, vertical, or at night, three green lights, vertical, signifies exit, and any movement inside prohibited.

By day, the arm horizontal and under it two balls vertical, or at night a green light between two red lights, vertical, signifies entrance or exit prohibited.

Hospitals.—Seamen are received in all the hospitals of the city, according to the beds disposable. Officers can be accommodated in the wards, or in private rooms at charges per day.

Sailors' home.—Maison du Marin, 104, Boulevard des Dames, is an establishment which has sleeping accommodation for officers and 70 men. An office is attached which provides berths for seamen free of charge.

Life-saving stations.—A lifeboat is stationed in the port; a lifeboat and a life-saving gun at Pharo battery; rocket apparatus in Avant Port Nord and Bassin de la Joliette; a life-saving gun at St. Henry customhouse; and a station for rendering aid on Plage du Prophète. Four steam tugs are fitted with life-saving guns.

Telegraph cables.—Four French cables are laid from Marseille to Algiers, one to Oran, and one to Bizerta; a British cable is laid

between Marseille and Barcelona, and two between Marseille and Bona.

Telegraph cables—Buoys.—Two cables, to Spain and Algeria, are landed on the beach southward of Rivière l'Huveaune, and are marked by two buoys; anchorage is prohibited in the vicinity.

Quarantine.—Vessels ordered to be placed in quarantine will hoist the yellow flag and as soon as possible proceed to Port du Frioul, Ratoneau Island, with an official on board.

Health officers do not board vessels; to obtain pratique, the medical officer should go ashore to their office.

Winds, barometer, etc.—According to observations made at Marseille for a period of 15 years, the mean annual height of the barometer is 30.01, and the mean annual temperature 57.40 Fah., the lowest mean monthly temperatures, December and January, is 44.7°, and the highest, July and August, 71.5°.

Planier Islet.—This small islet is low and level, with a reef extending 400 yards to the southwestward; 300 yards eastward of it is a rock on which is only a depth of 4 feet. It lies 8 miles 224° from the entrance to Marseille.

Light.—An electric flashing white light is exhibited, at 207 feet above the sea, from a round white tower in the center of Planier Islet (with a smaller one near it).

Fogsignal.—During thick or foggy weather a fog siren is sounded. (See Light List.)

Life-saving station.—There is a gun life-saving apparatus established at the lighthouse.

Lloyd's signals.—A Lloyd's signal station is established on Pomègues Island.

Time.—Greenwich time is kept; a tick by telegraph can not be obtained; a time siren is blown several times a day but not accurate for rating chronometers; the radio tick from the Eiffel Tower can be taken any day and is very satisfactory.

Marseille observatory is open free to officers for the purpose of comparing chronometers. Les Faculté des Sciences and some private establishments also allow comparisons to be made.

Le Veyron.—At 1 mile 67° from the light-tower is a rocky patch of 7 fathoms, with from 14 to 34 fathoms water round it.

Pomègues Island.—At 4½ miles 36° from Planier Islet is Cape Caveaux, the southern extremity of the island of Pomègues. This island extends northeast and southwest, and is 1½ miles in length and 400 yards in breadth; it is high, rocky, and arid, and its shores irregular, with several projecting points; the most eastern, named Doriou, has a battery on it. Port de Pomègues, near the middle of the southeastern side, is a cove open to the eastward, 100 yards wide, and 300 yards deep, with 3¼ fathoms of water, where vessels before

the construction of Port du Frioul used to perform quarantine. The island is generally clear of danger, but on the northwestern side there are one or two scattered rocks not far from the shore. Fort Pomègues, 282 feet above the sea, at the eastern end of the island, is conspicuous.

Signal station.—There is a semaphore, a white house and tower, 36 feet high, and 282 feet above high water, situated 500 yards south-eastward from the beacon on Pointe de Carapègue, on the northwest coast of the island. It is a Lloyd's signal station. There is a carriage road between the signal station and Port du Frioul.

Beacon.—A white triangular wall, with a black band, on Pointe de Carapègue, and a flagstaff on the southwestern summit, 256 feet high, of the island, about 400 yards southward of it, are marks for the measured distance, page —.

Ratoneau Island, northward of Pomègues, extends east and west $1\frac{1}{2}$ miles; its shores are very irregular, forming several bays and coves with projecting points. On Cape de Croix, its eastern extremity, is a battery, and on the summit of the island is the conspicuous fortress of Ratoneau. On the northern side of the island are the bays of Morgiret, Banc, and l'Eoube, open to the west and northwest, and used occasionally by fishing boats; there are also two bays at the eastern end of the island open to the southeastward, but adapted for small vessels. Port St. Estève, the western of the two, has a large quarantine hospital on its eastern side. A sunken rock lies close off Brigantin Point, the western extremity of Ratoneau; Grand-Salaman Islet or rock lies 250 yards 22° from the point, and is connected to the shore by a reef. Another rock, Eglandes, 350 yards farther eastward, has a reef extending 100 yards to the northwestward from it, with 15 fathoms close-to.

Beacon.—There is a beacon on the western part of Ratoneau Island.

Tiboulén Islet, nearly 400 yards westward of Ratoneau Island, is clear of danger with the exception of a rocky patch with $4\frac{1}{2}$ fathoms water, about 67 yards from its eastern side. Between this patch and the rock westward of Brigantin Point there are 11 fathoms.

Anchorage.—With southerly winds temporary anchorage will be found in from 17 to 19 fathoms to the northwestward of Cape de Croix, with Mourgon Rock on with the cape, and the entrance to the bay of l'Eoube well open.

Port du Frioul.—Ratoneau and Pomègues Islands are about 400 yards apart, but they are connected by a breakwater, forming on its eastern side Port du Frioul, which is protected by another breakwater projecting in a southwest direction from Ratoneau Island towards Pomègues, leaving an entrance about 150 yards wide to the southeast. The area thus inclosed is about 700 yards long and 300

yards wide, with depths of from $4\frac{1}{2}$ to 7 fathoms, sand and weeds. On both sides of the port are barracks, etc., moorings are laid down for naval vessels, and here vessels perform quarantine.

Light.—A fixed white light, elevated at 35 feet above the sea, is exhibited from a circular white stone turret situated at the extremity of the eastern mole of Port du Frioul. Visible 6 miles between Ratoneau and Pomègues Islands. (See Light List.)

Basse St. Estève, Buoy.—A shoal having only $1\frac{1}{2}$ fathoms water on it lies 133 yards from the shore, off Port St. Estève nearly 600 yards 61° from Port du Frioul lighthouse; it is marked by a black buoy surmounted by a cylinder, moored on the southern side, about 70 yards distant.

Château d'If Islet.—This small low islet, covered with fortifications, and on the summit of which is a large circular donjon, lies a little more than $\frac{1}{2}$ mile eastward of the entrance of Port du Frioul, and separated from the southeast shore of Ratoneau by a channel 450 yards wide, with 8 fathoms water. The north shore of the islet is bordered by shallow water, 4 fathoms being found at about 100 yards from the shore; at the eastern end are the Mourgon Rocks close-to.

There is anchorage in $7\frac{1}{2}$ or 8 fathoms, sand and weeds, between the islet and the eastern end of Ratoneau, on a line joining the hospital of that island and the donjon of Château d'If.

There is landing to the west of the lighthouse, either on the north or south side, according to the direction of the wind.

Light.—An occulting white light, elevated 69 feet above the sea, is exhibited from a white lighthouse situated on the east end of Château d'If islet. Visible 14 miles. (See Light List.)

Sourdaras Shoal and Canoubier Tower.—At 850 yards 70° from the Château d'If light tower is the southwest end of a rocky shoal named Sourdaras; it is about 250 yards in length, and lies in a northeast and southwest direction, with 1 fathom water on the center, which is marked by a beacon about 8 feet high, painted in black and white horizontal stripes and surmounted by a diamond. On the northeastern end of the shoal is the round tower of Canoubier, 49 feet high, painted in red and white horizontal stripes. Between this shoal and Château d'If there are depths of from 7 to 18 fathoms, sand and weeds; in the channel between it and Cape de Croix from 9 to 17 fathoms; and between it and Endoume Point from 6 to 8 fathoms.

Light.—A fixed white unwatched light is exhibited, at an elevation of 38 feet, from the beacon on the southwestern extremity of Sourdaras Shoal, and is visible 8 miles. (See Light List.)

Life-saving station.—A gun life-saving apparatus is established in Malmousque Bay to the southeastward of Pendus Rocks.

Endoume Point, 1,600 yards southwestward of Pharo Point Lighthouse is low, projecting, and has a battery on it; 200 yards north-northeastward from it are the Pendus Rocks. The intermediate coast is high and rugged and covered with numerous buildings, especially in the small bay of Catalans about $\frac{1}{4}$ mile southward of Pharo Point.

Endoume Islets.—On the southwestern side of Endoume Point are two islets of the same name; they are small, low, and separated from each other by a passage 100 yards wide, the southern being the smaller, with a battery on it. The channel between the islets and the main is 200 yards wide, with $2\frac{1}{2}$ fathoms water.

Taratatan Rocks, lying westward of Endoume Islets, are three patches of 5, $5\frac{1}{2}$, and 6 fathoms water, with 6 to 8 fathoms between them and the islets. The former lies nearly 800 yards 275° from the northern islet, and the latter lies 300 yards 244° from the former.

Anchorage—Marseille Roads.—The anchorage in Marseille Roads off the entrance of the port and northwestward of the tower of St. Jean is in 14 to 18 fathoms, sand and weeds, about $\frac{1}{2}$ mile from the southern end of the mole. It is convenient for vessels with easterly winds, but northwesterly winds, which are the most prevalent and blow strongest, send in a heavy sea.

Endoume Roads, to the southward of the point of the same name, is much resorted to by vessels during winds from the northwest quarter when unable to enter Marseille. The anchorage is in 7 or 8 fathoms, sand and weeds, Endoume Islet battery bearing 303° .

Large naval vessels anchor to the south-southwestward of Endoume Islets, off the low shore of Mont Rédon, in from 12 to 14 fathoms, sand and weeds. The anchorage is southwestward of a line drawn through Ratoneau hospital and the donjon of Château d'If.

Buoys.—Five swinging buoys at which vessels can adjust their compasses are laid down in the roads.

Caution.—Vessels should not anchor between the Château d'If and Endoume Islets.

Fogs.—In the Bay of Marseille fogs sometimes prevail which render navigation very difficult; in the winter they are accompanied with snow, but in the summer in the months of July, August, and September, they are more frequent with light winds from southeast. The barometer falls, but they rarely last longer than 24 hours, when the barometer will rise.

Aspect.—In clear weather the position of Marseille will be known from a distance by Mount Ste. Victoire, near Aix, which is visible 60 miles or 40 miles from the coast; the Pilon du Roi, 2,329 feet high, in the form of a truncated cone with a slightly rounded summit, situated between Aix and Marseille; St. Beaume, 3,766 feet, and Pilon St. Clement of 2,316 feet, between Marseille and Toulon. The latter

is the easternmost and is an excellent mark for vessels coming from the southeastward. The mountain of St. Beaume, as also that of Coudon, are good marks for Marseille and Toulon; they are so different in aspect that it is impossible to mistake them. St. Beaume forms a peak on the eastward with a remarkable slope on the same side, while Coudon slopes abruptly on the east. In proportion as Marseille is approached the high land of St. Cyr or the Carpiagne, elevated 2,119 feet and visible 50 miles, will be seen; then the chain of arid mountains which extend eastward of the port, and which form as far as Ciotat the highest cliffs of the coast of Provence.

Directions.—At about 30 miles southward of Marseille, in clear weather, the mountains in the vicinity of Toulon will be seen, Cape Sicie, and the conical mount of Six Fours, to the northward of the cape. Farther westward near Ciotat is Bec de l'Aigle, remarkable for its particular aspect; the cliffs of Cape Canaille, 1,224 feet high, near the port of Cassis; the steep precipices of Grande Chandelle, 1,476 feet, and Mount Puget, 1,798 feet high; and the mountain of Marseille-Veyre, a large elevated mass with barrel slopes, 1,421 feet above the sea, which forms the southeastern promontory of the Bay of Marseille. There are several islands off the cliffs at the base of the mountain, but ile de Riou is the only one visible at any distance; it is 630 feet high, rugged, with a small tower on it. From the western extremity of Marseille-Veyre the coast turns suddenly to the north, diminishing in height and presenting a kind of break, which indicates the Bay of Marseille. On the northern side of the bay are the high reddish cliffs of Méjean Point, which gradually descend to Cape Couronne. On arriving near the entrance of the bay, Planier Islet Lighthouse should be seen, then the group of islands westward of the port which at first are blended with the land, the fort of Notre Dame de la Garde on a hill south of the city, and lastly the numerous buildings.

Vessels from the southward having passed Planier Lighthouse should steer for Château d'If, and after passing on either side of this island at the distance of 200 yards bring the lighthouse to bear 213° , when a 33° course will lead about midway between Cape de Croix, the east end of Ratoneau Island, and Canoubier Tower; when Joliette lighthouse on the southern end of the breakwater bears about 75° , steer as convenient for the entrance between Joliette on the north, and Maure and Pharo (green light) Lighthouse on the south.

At night, pass no less than $1\frac{1}{2}$ miles eastward of Île de Planier Light, and steer to pass eastward of Île d'If Light; by keeping in the small white sector of Saut de Marrot Light a vessel will pass through the channel between Château d'If and Sourdaras and Canoubier Rocks. Small vessels may pass about 300 yards westward of En-

doume Islets, and in mid-channel between Endoume Point and Canoubier Tower.

Vessels approaching Marseille, bound for the North Outer port, should make Saut de Marrot Light and steer for it, keeping within the small white sector as it is approached, until the lights on the traverse de la Pinède are seen, when the course should be altered so as to pass midway between those lights. Almost all sailing vessels take tugs, which cruise, when the weather permits, as far seaward as the vicinity of Île de Planier.

Harbor regulations.—Steamers entering or leaving must have a look-out man stationed on the foremast, to report any movement of vessels in the roads, Avant Port Sud or Bassin de la Joliette. The signals for a tug is a white flag at the yardarm.

Mont Redon.—At 1 mile southeastward of Endoume Point is Rocas Blanc Point, with a battery on it; the shore between is high and rugged, being the base of the heights on which there is the fort of Notre Dame de la Garde.

About 2 miles southward of the latter point, is the battery of Mont Redon on a projection of low land in the vicinity of which are houses and plantations. Mont Redon is an isolated hill on the shore $\frac{3}{4}$ mile 33° from the battery. The intermediate coast forms a bight having a beach 1 mile in extent, $\frac{1}{2}$ mile off which there is anchorage with easterly winds in from 6 to 7 fathoms sand.

Marseille Approach—Fairway reserved for traffic when submarine vessels are exercising.—When a square flag, lower half yellow, upper half red, is hoisted at the signal stations or on the vessel escorting submarine vessels, to indicate that the latter are exercising submerged, all vessels wishing to enter or leave the Port of Marseille are earnestly requested to make use of the fairways, defined below, in which submarine vessels are prohibited from exercising submerged.

These fairways are as follows:

In North Road, eastward of the alignment of Maire Island summit and Château d'If summit.

In South Road, eastward of the alignment of the western extremity of Riou Island seen between Cape Croisette and Maire Island.

Cape Croisette is low, rugged, and projects westward from the foot of the high, precipitous and barren mountains of Marseille-Veyre, 1,421 feet high, on which is a tower. The coast between the battery of Mont Redon and the cape is clear of danger, and in a small cove northward of the cape are some manufactories.

Semaphore.—A semaphore is established about 1 mile 106° from the cape; it is elevated 377 feet above the sea.

Maire Island, on the southern side of the cape and close to it, is triangular in shape, 436 feet high, steep, whitish, with some vege-

tation on it, and of remarkable appearance; it is clear of danger, and between it and the cape is a passage for boats.

Two small rocks, 13 feet high, lie close to the southern point.

Tiboulen Islet, about 200 yards northwestward of Maire Island, is also clear of danger; there is a passage between the two for small vessels.

These two islands, in conjunction with Cape Croisette, form two anchorages; one on the north, sheltered from southerly winds, in 9 or 10 fathoms water; the other on the south, sheltered from northerly winds, in from 11 to 15 fathoms.

From Cape Croisette the coast trends southeastward to the battery of Marseille-Veyre, distant $1\frac{1}{2}$ miles. It is rugged and steep-to.

Jaire Island, about $\frac{3}{4}$ mile southeastward of Maire Island, is moderately high, nearly 1 mile in length northwestward and southeastward, narrow, with irregular shores.

Chévres Bank, with $3\frac{1}{2}$ fathoms water, extends southward from the Veyre battery, between which and Jaire Island there are from 4 to 7 fathoms.

Calseraigne Island, lying southeastward of Jaire Island, is nearly of the same form but smaller. The channel which separates them is $\frac{1}{2}$ mile wide, with from 5 to 9 fathoms water, but a rocky shoal (Miet Reef), with 7 feet on it, lies in the channel 400 yards southeastward of Jaire.

Beacon.—Miet Reef is marked by an iron beacon, painted red and black, in horizontal bands, and surmounted by a red spherical top-mark, the top of which is 20 feet above the level of the sea.

Miet Reef is situated between Calseraigne and Jaire Islands.

Riou Island, $\frac{1}{2}$ mile southward of Calseraigne, is $1\frac{1}{2}$ miles in length in a west-northwestward and east-southeastward direction, about $\frac{1}{2}$ mile in breadth, steep, high, rugged, and has two remarkable peaks, each being surmounted by a tower; the eastern peak is 630 feet high. A short distance from its eastern end are the islets of Grande Congloué and Petite Congloué; the channels between them and Riou carry from 13 to 21 fathoms water. The small islet Moyade lies off the western part of the island, with a deep channel between it and Riou; and about 300 yards west-northwestward of Moyade is a rock awash. In the middle of the passage between the islands of Riou and Calseraigne there is Milieu Reef, with only $1\frac{1}{2}$ fathoms water on it.

Beacon.—An iron beacon, painted red and black in horizontal bands, and surmounted by a red sphere, 20 feet high, stands on Écueil de Milieu.

Les Empereurs, or Farillons de Riou, are two rocks 82 and 36 feet high, off the southeastern part of Riou, from which the outer and higher one is distant about 500 yards; the bottom is foul between them and Riou.

Sormiou and Morgiou Bays.—From the battery of Marseille-Veyre the coast is high and rugged, and trends eastward, with a bend to the north, to Bec de Sormiou Point, a distance of $2\frac{1}{2}$ miles. At $1\frac{1}{4}$ miles beyond the point is Cape Morgiou, of moderate elevation, with a battery on it and high land above it. Between the two points the coast falls back to the northwest, forming Sormiou Bay, $\frac{1}{4}$ mile deep and open to the southeast, affording shelter to coasting vessels with offshore winds. At the head of the bay is a customhouse and some other houses.

At 1 mile eastward of Cape Morgiou is Cape Davenson, high and rugged, and commanded by the elevated and sharp-pointed mountain of Puget, 1,798 feet high.

Between the two capes the coast is bold and forms Morgiou Bay, which extends to the northwestward, and affords shelter with offshore winds.

Port Pin.—At 1 mile to the southeastward of Cape Davenson is Castel-Vieil Point, bold and steep-to, and about $\frac{1}{2}$ mile farther on is Cacao Point, low, but also steep-to. Between these two points are two narrow inlets with deep water; one extends to the northwest, the other to the northeastward. The latter, named Port Pin, is convenient for small vessels. In the port there are 7 and 8 fathoms water.

Port Miou, $\frac{1}{4}$ mile northeastward of Cacao Point, is a narrow inlet which affords better shelter than elsewhere on this part of the coast. Its entrance is open to the southeastward and within it trends $\frac{1}{2}$ mile to the northeastward, with 16 and 18 feet water in the middle, while there are 9 and 11 fathoms in the entrance; it is sheltered from all winds and sea. During the rainy season a strong current runs out of the inlet. It is difficult to enter under sail, and for this reason is not much frequented. The inlet will be known by a chapel on a hill on the eastern point of entrance and by Cacao Point, which is the termination of a yellowish height.

Three mooring buoys have been placed along the eastern side of the peninsula of Cacao, southward of the entrance to Port Miou; they are moored from 77 to 109 yards from the shore.

Port Cassis.—The coast between Cacao Point and Cape Canaille forms the Bay of Cassis, which is $1\frac{1}{2}$ miles wide and 1 mile deep. At the head of the bay and 1 mile east-northeastward of the entrance to Port Miou is Port Cassis, which, though small, is safe and admits vessels of 13 feet draft that moor head and stern. It is formed by a mole projecting 318 yards westward from the eastern shore, by which it is protected from southerly winds, the entrance between the mole head and western shore being from 65 to 70 yards wide. The town is at the eastern end of the port. The figs and pomegranates of Cassis are held in much estimation, and it has a considerable

trade in excellent muscatel wine produced in the vicinity. Shipbuilding is carried on, also coral fishing. The port is easily recognized by the town, two mills on the heights above it, a lighthouse on the shore opposite the mole head, a lighthouse on the mole, and a castle on a steep cliff southward of the town. Caution is required in entering, as a current sets out from the entrance caused by a large spring in the rocks under the lighthouse. With strong winds from the southward it is dangerous to enter, in consequence of the heavy sea at the entrance, when it will be better to make for Port Miou.

Lights.—An occulting white electric light, visible 14 miles, is exhibited 58 feet above the sea from a masonry tower 46 feet high, erected on the mole.

A fixed red electric light visible 8 miles, is exhibited 39 feet above the sea from an iron column with iron hut, the whole 33 feet high, located on the point southward of the old Battery of Lèques. (See Light List.)

Cape Canaille, south-southeastward of Cassis, is slightly projecting and rises abruptly to lofty precipices 1,224 feet high. The intermediate coast, skirted close in by rocks, is lower, forming two points projecting to the southwestward; that near Cassis is named Château, and the other Corton. Reefs extend nearly 150 yards from both points, and on each side of the latter point is a bay with a sandy beach.

Bec de l'Aigle.—From Cape Canaille the steep high rugged coast curves out slightly to the southeastward to Bec de l'Aigle, distant $3\frac{1}{4}$ miles. This headland is 508 feet high, arid, and rugged, with some resemblance to the beak of an eagle, from which it derives its name; it is of a reddish color and slopes toward Ciotat. About $\frac{3}{4}$ mile northwestward of the Bec there is a chapel on the high land over the sea, and the ruins of a mill to the eastward.

Semaphore.—On the cape 3,281 yards 271° from Ciotat, elevated 1,063 feet above the sea, is a semaphore.

Cassidaigne Reef.—Southward of Cassis Bay 2 miles from the coast and 216° from the semaphore is a rocky shoal named Cassidaigne. It is 300 yards in length north-northwestward and south-southeastward, with its northern part awash at low water and 13 feet on its southern end. Although the sea nearly always breaks on it, it is very dangerous at night or in thick weather, being steep-to in all directions. From its northern part the Bec de l'Aigle is in line with the northern end of Verte Islet bearing 72° ; the castle of Cassis is in line with the white road over the town of the same name, 356° , and the island of Riou bears 285° .

Beacon.—A beacon tower 60 feet high, painted black and red in horizontal stripes is erected on the reef.

Clearing mark.—The channel between the shoal and the land is clear of danger, having a depth of from 22 to 44 fathoms in it. To

pass southward of the Cassidaigne, keep Planier Light well open southward of les Empereurs Rocks (off the southeastern part of the island of Riou), and bearing northward of 287° .

At night, Ile de Planier Light open northward of Riou, bearing 278° , or Grand Rouveau Light bearing 117° , leads northward and Planier Light bearing northward of 287° , or Grand Rouveau Light eastward of 106° , leads southward of the shoal.

Verte Islet, 600 yards eastward of Bec de l'Aigle, is moderately high, irregular in shape, and nearly 700 yards in length, north-north-westward and south-southeastward; on its southeastern end are two small forts. It is bold-to except at the northeastern end, where a shoal with 4 fathoms on its outer part extends 100 yards off.

Canonnières, Les.—The channel between the islet and main has a depth of from 7 to 18 fathoms, but is obstructed nearly midway (250 yards from the islet), by a rocky shoal with only $\frac{1}{2}$ fathom water on it, named South Canonnier.

Beacon.—A beacon, 19 feet high, colored red and surmounted by a cone, stands on the northern part of South Canonnier.

A rock with $3\frac{1}{2}$ fathoms on it exists to the westward South Canonnier, with the beacon bearing 108° , distant 55 yards. There is a depth of 11 fathoms between this rock and South Canonnier.

The North Canonnier, another rocky shoal, with 13 feet on it, lies 250 yards 24° from the beacon and 150 yards from the northern end of the islet. Between these shoals and Bec de l'Aigle there are from 11 to 18 fathoms water.

Ciotat Bay, situated between Verte Islet and Fauconnière Point, is $1\frac{1}{2}$ miles deep, with 35 fathoms water at the entrance decreasing gradually in depth toward the shore. About $\frac{3}{4}$ mile north-northeastward of Bec de l'Aigle is the extremity of a mole, between which and a small tongue of land on the north, terminated by another mole projecting southward, is the entrance to the small port of Ciotat.

Port de La Ciotat is small; its entrance is between Môle Neuf and a small tongue of land on the north, terminated by Môle Bérourard which projects southward. The entrance to the port is 104 yards wide, with a depth of 20 feet, is sheltered from all winds, but is suitable only for small vessels, the depth inside being 2 and $3\frac{1}{2}$ fathoms; a shoal of $1\frac{1}{2}$ fathoms lies within the angle of the south mole. A pier projects into the middle of the harbor from the southeastern side. The town is on the northern side of the port, surrounded by an ancient rampart; the houses are well built, and the streets are regular and well paved, and it contains a population of about 10,000. It has trade in wines, dried fruits, and oil, the vicinity being interspersed with vineyards, olive grounds, and plantations of oranges and figs. Ship-building is also carried on, the large iron steamers belonging to the company of Les Messagerie Maritimes are constructed here, and the

company possesses a dry dock 511 feet long over all, 498 feet on blocks, 70½ feet wide at entrance, and 21½ feet water over the sill at low water; there is also a patent slip. The port is almost exclusively used by the steamers of this company. On the northern side of entrance is a small fort.

Buoy.—A white buoy is moored off the mole.

Lights.—An occulting white light, elevated 42 feet above the sea, and visible 11 miles, is exhibited from a white circular turret, 39 feet high, on Berouard molehead, northern side of entrance to Ciotat.

Also from a circular white turret situated on the head of Môle Neuf, elevated 48 feet above the sea, is exhibited a fixed red light, visible 6 miles. (See Light List.)

A yellow flag indicates there is a heavy sea at the entrance.

Life-saving station.—A mortar and gun life-saving apparatus is established at Ciotat.

Repairs.—At Ciotat all repairs can be executed by the Compagnie des Messageries Maritimes, for which purpose there is every appliance. Large castings for the engines of their vessels are made at Marseille.

“There is an 80-ton floating crane, a 20-ton electric crane, and two 5-ton titan cranes. A 5-ton crane can work on either side of the patent slip.”

Docks.—See Appendix I.

Supplies.—Water and provisions of all kinds are obtainable.

Coal.—About 200 tons are kept in stock.

Measured distance.—There is a measured distance of 8.753 miles southward of Baie de la Ciotat for ascertaining the speed of steamers; the running mark is Tour de Port Issol and Crède Beacon in range 89°. The western limit is the alignment of La Chapelle de Sainte Croix and La Cassidaigne Beacon, 359°. The eastern limit is the alignment of Villa Marie-Rose, a blue house with a red roof, and a beacon on the western point of Île de Bandol, 1°. The square tower of Chaâteau Bizalion, on the shore northward of Ciotat, and Canonnière du Sud Beacon, in range about 2°, divides the distance into two parts, the western of which is 2.8 miles in length. The depth at the western end of the distance is about 100 fathoms, and it decreases to about 23 fathoms at the eastern end.

Ciotat Roads.—There is anchorage during fine weather in Ciotat Roads, but strong winds from the northwest (mistrals) over the high land above the town cause heavy squalls and eddies. With these winds vessels from the westward, after doubling Verte Islet, should keep in the steady breeze and stand well on toward the head of the bay and then tack. Large vessels should anchor in from 8 to 11 fathoms, mud and weeds, about 700 yards eastward of the northern lighthouse; small vessels nearer in. The anchorage is limited north-

ward by Le Capucin slightly open southward of the square tower of the Hôtel de Ville, the southern tower in the town; and southward by Môle Neuf lighthouse in range with Ciotat semaphore. At night, anchor with Môle Bérourard Light bearing between 327° and 260° .

Do not anchor southward of the southern limit, or more than 600 yards offshore, or in a greater depth than 10 fathoms, where there is less shelter from the wind, and anchors are liable to drag; vessels disregarding this precaution have been driven to sea.

Cereste Roadstead.—One mile east-northeastward of Ciotat is Cape Moulin, of moderate elevation, with a battery and two wind-mills on it; the intermediate shore is low, with two mills on a point midway and is bordered by shallow water. To the eastward of the cape is a small beach with some sunken rocks off it. This part of Ciotat Bay is called Cereste Roads, and affords better anchorage and is more easily gained than the former. Vessels may anchor anywhere southward or eastward of the cape in from 6 to 8 fathoms water, about 700 yards from the shore. Both these anchorages should be quitted with on-shore winds.

Lecques Bay.—At less than $1\frac{1}{2}$ miles eastward of Cape Moulin is that of Lieuquai, the intermediate coast being low. About $\frac{3}{4}$ mile farther on is Cape St. Louis, a long mile beyond which is Grenier Point and Battery; the shore between the point and cape is low and forms a semicircular bay $\frac{1}{2}$ mile deep terminating in a beach. On the north shore of the bay is the town of Lecques, and about the middle is a windmill.

Anchorage.—With land winds vessels may anchor in the bay in from 5 to 6 fathoms water, with Bec de l'Aigle on with the northern extremity of Verte Island and Lesques Chapel in range with the extremity of a small jetty; there is also anchorage in the southern part of the bay in 5 to 8 fathoms 292° from the old windmill of Tarante.

Fauconnière Point.—On the northern slope of hills toward the low land of the bay is the chapel of St. Jean, and about 3 miles eastward of Grenier Point is Cadiere old telegraph, elevated 1,073 feet. At less than $\frac{1}{2}$ mile southward of Grenier Point is Fauconnière Point, the eastern extremity of Ciotat Bay; it is high, bold, and steep-to. Next to Fauconnière Point is the high and rugged Cape d'Alon or Deffend Point; the coast between forms a slight bay.

Alon Shoal.—About $\frac{1}{2}$ mile eastward of Deffend Point is a small cove open to the south named Port d'Alon, and about 300 yards off its mouth and about 1,200 yards 100° eastward from the point is Alon Shoal, a rocky shoal with only 2 feet water on it.

Rousse Islet.—About $1\frac{1}{2}$ miles 112° from Deffend Point is Engravier Point; the coast between is high and rugged, and forms Moutte Bay $\frac{1}{2}$ mile deep. About $\frac{1}{4}$ mile southward of the latter point

is a small rocky islet named Rousse, 33 feet high; it is separated from the shore by a channel less than 200 yards wide, with $1\frac{1}{2}$ fathoms water in it.

Bandol Bay.—One mile eastward of Rousse Islet is the point and castle of Bandol; the point projects southward and is of moderate elevation, forming on the west a small shallow bay used only by fishing vessels. On the eastern side of the point is Bandol Bay, about $1\frac{1}{2}$ miles deep and 1 mile wide, with from 12 to 16 fathoms water at the entrance, shoaling gradually to the beach, there being 5 fathoms at about 700 yards from the head of the bay. The town of Bandol is situated a short distance north-northeastward from the point.

A short distance northward of Bandol Point a mole projects to the southeastward about 200 yards, and then turns to the northeastward from the eastern side of Point du Château de Bandol, for 350 yards, affording shelter to small vessels of 11 feet draft of water.

A small channel, with $1\frac{1}{2}$ fathoms water, leads to the loading and discharging quay, but in consequence of the port silting up, vessels can now only approach the quay as they lighten by discharging.

Bandol Island, 400 yards southward of Cape Bandol, is nearly 700 yards long, east and west, and skirted by rocks.

Between the island and the shore the channel is obstructed by shallow water and weeds.

Fournigue Rocks—Beacon.—To the eastward, 300 yards, are the Fournigue, two small islets or rocks, on one of which is a tower 26 feet high colored red and black in horizontal bands, with spherical topmark; the depths between Bandol and Fournigue are $1\frac{1}{2}$ to $4\frac{1}{2}$ fathoms.

Light.—A fixed red light is exhibited, at an elevation of 29 feet above the sea, from a white iron support above shed at the extremity of the mole at Port Bandol, visible 3 miles. (See Light List.)

Buoys.—Four red conical buoys mark the northern side of the port, and three black conical buoys the southern side. Two white mooring buoys are moored in the entrance.

Life-saving station.—A mortar life-saving apparatus is established at Bandol.

Anchorage.—The road in front of Bandol Pier affords good shelter from the northwest quarter, by anchoring to the northeast and east-northeastward of the Fournigue, in from 5 to 8 fathoms, sand or mud, with Cride Point beacon in range with the lighthouse on Grand Rouveau.

The Marseille and Nice railroad skirts the head of the bay, and crosses the river de Aran over a bridge of nine arches, which is a good mark.

Directions.—At night, from the westward keep Ciotat lights open southward of Pointe du Deffend, about 298° , until Bandol mole

light is open eastward of Île de Bandol; then steer east-northeastward to the anchorage, but bring the mole light westward of 0° to pass eastward of La Fournigue, and keep Grand Rouveau Light open westward of Pointe de la Cride.

To enter the port, pass between the black buoy off the end of the mole and the outer red buoy; anchor in the space marked by the buoys.

Cride Point is low and projecting to the west-southwestward, with a reef extending 400 yards in the same direction.

Beacon.—On the extremity of the point is a battery, and a beacon tower 21 feet high, painted in black and white horizontal stripes, surmounted by a diamond, marks the extremity of the reef off it.

Port Issol.—At 1 mile eastward of Cride Point is Port Issol Point with a tower on it; a reef extends 300 yards 247° from the point. On the western side of the point is a small bay with several rocky shoals.

Sanary (formerly St. Nazaire) Bay lies between Cride Point, on the north, and a group of islands of which Île des Embiez is the largest, on the south; it is about 2 miles wide and about the same deep, affording good shelter with winds from northwest (round by north) to south in from 6 to 8 fathoms water.

Caution—Oyster Bank.—At $\frac{1}{2}$ mile to the southward of Cride Point is a vast oyster bank, which extends to the eastward nearly 1 mile. Vessels should avoid anchoring on the bank by keeping the castle on Île des Embiez to the westward of 180° .

Port de Sanary.—The small port of de Sanary (St. Nazaire) is in the north part of the bay about $\frac{1}{2}$ mile from Port Issol Point; it is formed by a small mole on the western side of the bay projecting southeastward from an elevation, on which is a chapel and two mills; the entrance to the port lies between a black buoy moored off the extremity of this mole and a red buoy marking the western edge of the shoal water extending off the eastern shore; it is 27 yards wide and available for vessels drawing from 10 to 13 feet water.

Directions.—The bell in the belfry, in range with an iron rod placed at the right angle of the terrace of a white house with two stories, having two windows on the south side fronting the quay, leads through this entrance.

Vessels must not pass eastward of this line.

A jetty projects southwestward from the eastern shore, the space inclosed being about 200 yards in length, with 2 fathoms water. The town of Sanary is within the mole and jetty. Vessels moor with anchor ahead and stern fast to mole.

Light.—A fixed white light, elevated 25 feet above the sea and visible 5 miles, is exhibited from a white pole over a wooden house on the extremity of the mole. (See Light List.)

Nègre Point, southward of Sanary, is low and projecting westward, and on it is a ruined guardhouse; a reef extends a little more than 100 yards from the point. The intermediate shore is low, bending eastward, with a sandy beach, 1 mile from which on the rising ground southward of it is the village of Maron; it is bordered by shallow water. The Ollioules River flows into the sea close to the southeastward of Sanary, and another river farther south.

Port de la Coudurière, southeastward of Nègre Point, is small and inclosed by two moles; the entrance is about 60 yards wide, and the southern part of the port has been dredged to a depth of 16 feet.

Light.—A light is exhibited from a metal column, 21 feet in height, on the head of the large mole.

Semaphore.—At $1\frac{1}{2}$ miles eastward of Nègre Point is the summit of Mount Six-Fours, a conical mount 702 feet high with a tower and semaphore on it; it is conspicuous from seaward.

From Nègre Point the shore continues southward 1.3 miles to the point and village of Brusc; it is low and irregular with several small bays and beaches. At $\frac{1}{2}$ mile westward of Brusc Point is Ile de la Tour-Fondue, now connected with and forming the eastern extremity of Ile de Embiez.

Ile des Embiez is of a triangular form, $\frac{3}{4}$ mile long, high in the center, and has an old château with a tower, and there are the ruins of a soda manufactory on it, and a customhouse on the island. It is about 400 yards from the mainland, and in the southern part of the space between is a small low islet named Gau, nearly united by rocks to the coast, and separated from Embiez by a narrow boat channel. Cougousset Point, the southern extremity of Embiez, is rugged, 210 feet high and remarkable; thence the west coast of the island trends north, forming several hills and points, to the battery of St. Pierre at the northern end. It is bordered by shallow water, rocks and reefs.

Life-saving stations.—A rocket life-saving apparatus is established on Embiez Island and at the lighthouse on Grand Rouveau.

Rouveau Islands.—West-northwestward of Embiez Castle, and 700 yards from Embiez Island, is a rugged islet, 118 feet high, surrounded by rocks and reefs named Grand Rouveau with a lighthouse on it; about 800 yards 67° from it and 250 yards from St. Pierre Point is Petit Rouveau, 46 feet high, also surrounded by rocks and shallow water with several high rocks between it and the point.

Sautaire Pass.—To the southeast of Grand Rouveau are two low islets, that of Cauvelle (near Embiez) and Clapassude. These two islets, with the rocks and reefs around them, also choke the passage between Grand Rouveau and Embiez. A small channel, however, named Sautaire Pass, about 67 yards wide with $2\frac{1}{2}$ fathoms water, exists midway between the shoals of Cauvelle and Clapassude islets.

Range mark.—The western end of Petit Rouveau, in range with Château Michel on the slope of a hill a little over $\frac{1}{2}$ mile northeastward of Sanary, leads through the pass; but unless in a vessel of light draft, and in a case of necessity, no stranger should attempt the passage.

Magnons Islets.—These two small islets, which are nearly united, lie 400 yards westward of Grand Rouveau, and are surrounded by rocks at from 150 to 400 yards off; they are separated from Grand Rouveau by a channel 100 yards wide in which is a depth of $3\frac{1}{2}$ fathoms between the reefs on either side.

Castelle Rock and Séches des Magnons—Beacon.—At 300 yards southeastward of the larger Magnon Islet is a rocky head with 1 foot water, named Castelle; and nearly 400 yards 230° from the islet is a rocky patch on which is only 1 foot water, named Séches des Magnons, on the southern extremity of which is a red beacon tower with conical top-mark, 26 feet high. As shoal water extends beyond this tower, vessels should not approach it within 200 yards.

At 200 yards 292° from the tower there are $1\frac{1}{2}$ fathoms; 400 yards westward is a patch of $5\frac{1}{2}$ fathoms; and nearly the same distance farther out another patch of 6 fathoms, named Basses de la Moulinière, with 11 and 15 fathoms around.

In bad weather the sea breaks heavily on the Basses de la Moulinière.

The rocks and shoals above described extend 2 miles westward from the mainland, and form the southern boundary of Sanary Bay.

Light.—A group occulting white light, visible 18 miles, at an elevation of 151 feet above the sea, is exhibited from a square stone lighthouse, situated on the summit of Grand Rouveau Island. (See Light List.)

Brusq Roadstead, on the south side of Sanary (St. Nazaire) Bay, is protected by Ile des Embiez and the other islets before described on the southwest, and by the mainland on the east; it affords convenient anchorage for all classes of vessels in from 5 to 8 fathoms water, with a bottom of mud, sand, and weeds. A good berth for a small vessel will be found with Riou Island just open of the north part of Petit Rouveau, in 5 or 6 fathoms, but as Riou Island is 20 miles distant and not always to be seen, the northern extremities of Ile des Embiez and Grand Rouveau in line, and the summits of Ile de la Tour-Fondue on with Cougousset Point summit, the highest part of Ile des Embiez, indicate a good anchorage in 6 fathoms. In taking this anchorage the islands should not be approached too closely, and after rounding the Séches des Magnons a berth should be given to the Basse Renette, a shoal of 18 feet water, lying 350 yards northward of Grand Rouveau; and also to the Casserlane, a shoal of 2 feet, 350 yards northward of Petit Rouveau and marked by a red beacon

tower, with conical top mark, 27 feet high. The Grand Canoguier, a rocky shoal about 200 yards in extent, with $4\frac{1}{2}$ fathoms, lies northward of the usual roadstead, and vessels of heavy draft or those taking an outside berth should avoid anchoring on it.

Small vessels ground on the bank between the islands and the village of Brusc, where the bottom is soft mud.

Life-saving station.—A gun life-saving apparatus is established at Brusc.

Directions.—Making for Brusc Roadstead from the southward, the Magnons will be cleared by keeping the chapel on Cape Sicié open to the southward of Cougousset Point, the southern extremity of Ile des Embiez, and to pass outside the Basses de la Moulinière the railroad viaduct at Bandol (nine arches) should be kept well open to the west of the beacon at Cride Point until St. Pierre Point, the northern extremity of Ile des Embiez, is open northward of Grand Rouveau.

Basse Renette will be cleared by keeping Magnons Tower open westward of the islets of the same name until the lighthouse on Grand Rouveau bears south-southwestward, and La Casserlane, by keeping the Magnons Tower open westward of Grand Rouveau until the castle on Ile des Embiez is open eastward of Petit Rouveau.

Caution.—Madragues or tunny fishing nets extend off above $\frac{1}{2}$ mile from the island of Embiez westward of the anchorage, and will also be found in most of the adjacent bays; caution is necessary when entering.

Cape Sicié, southeastward of Cougousset Point, is a dark bold prominent headland, 1,181 feet high, terminating in two small peaks forming a saddle; there is a chapel and telegraph station (semaphore) on it. The coast between the point and cape is for the most part bold, skirted here and there by rocks.

At 300 yards southeastward of the southeastern point of Cape Sicié (Garde-Vieille Point), is the base du cap Sicié, a rocky shoal of $2\frac{3}{4}$ fathoms water, with 12 fathoms between it and the land.

Signal station.—There is a semaphore, with a white house and tower, 36 feet high, on the eastern peak of Cape Sicié, 1,119 feet above high water.

Frères Islets, 800 yards eastward of the southeastern extremity of Cape Sicié, are two rocky islets, the northern one 65 feet and the southern one 49 feet high, with no passage between them. The channel between the islets and the main is narrowed by a shoal, with $3\frac{1}{4}$ fathoms on it, which extends 200 yards from the shore, leaving a narrow passage of about 350 yards wide with 8 to 11 fathoms water. The islets are clear of danger.

Blauquières Bank.—About 10 miles westward of Cape Sicié is Blauquières Bank, on which are from 52 to 150 fathoms water, with

a bottom of sand, gravel, and shells. The water off this part of the coast being deep, and the soundings irregular, the mariner is referred to the chart.

Sablettes Bay.—From the southeastern extremity of Cape Sicié the coast trends to the northeastward to the head of Sablettes Bay; a low, sandy, narrow neck separates the bay from the Lazaretto roadstead of Toulon to the northeastward. The beach is rather more than $\frac{1}{2}$ mile in extent east and west, and the shore is bordered all around to a distance of nearly 400 yards by shallow water. The bay affords anchorage with northwest winds in from 9 to 12 fathoms, sand; but a rocky patch with $4\frac{1}{2}$ fathoms on it, lying 700 yards 216° from the battery of St. Elme, on the eastern side of the bay, should be avoided.

Beacons.—A beacon tower, painted in black and white horizontal bands, is erected on the rocks off Marigot Point.

A beacon tower, painted black and white in horizontal bands, stands on the rocks off a point, with a battery on it, on the western side of the bay.

Sablettes Bay—Telegraph Cable.—A submarine telegraph cable is landed at the head of this bay, the position being marked by two beacons, painted white and blue in horizontal bands and surmounted by circular white top marks; these beacons, when in range bearing 24° , indicate the direction of the cable. Anchorage is prohibited in the vicinity.

Cape Sepet.—At 1,300 yards 134° from St. Elme battery is the point and battery of Marigot, with a reef extending 200 yards from it, on which the sea breaks, the shore between being rocky. Rascas Point, eastward of Marigot Point, should not be approached within 300 yards; the intermediate coast forms a bend to the northward with cliffs and a small beach at the head of the bay. At 200 yards eastward of Rascas Point is Cape Sepet, the termination of a hill 426 feet high. On the hill is a semaphore and a pyramidal monument erected to the memory of Admiral Latouche Treville. The cape is the western point of entrance to the road of Toulon.

Canier Point, about 800 yards northward of the cape, has a rocky ledge projecting about 100 yards from it, marked by a beacon tower painted in black and white horizontal bands; on the point is a battery.

Galette Rock, which is awash, lies about $\frac{1}{2}$ mile northward of the cape and 50 yards from the shore.

Anchorage.—Between this rock and Canier Point, off the small cove of Roseaux, there is anchorage, sheltered from the northwest, in from 5 to 10 fathoms, sand and weeds, about 200 yards from the shore. It is frequentel by vessels bound to Toulon during strong northwest winds.

Cape Sepet Light.—A group flashing white light, visible 23 miles is exhibited from a circular white lighthouse, situated on Rascas Point at an elevation of 194 feet above the sea.

Shoal—Buoy.—A shoal, with a depth of $2\frac{1}{2}$ fathoms over it, lies 800 yards 215° from Cape Sepet Lighthouse. It is marked by a discoloration of the water. A black conical buoy with cylindrical top-mark is moored on the southeastern side of the shoal.

Toulon Bay.—At 3 miles eastward of Cape Sepet is Carqueyranne Point, and between them is the entrance to Toulon Bay, which extends about 5 miles in a northwest direction; the shores approach each other at about half that distance in, and again opening out form an inner and outer bay, the outer named the Great Roadstead, and the inner protected by a breakwater (*Jetée de la Grosse Tour*) which extends from the Grosse Tour nearly across to the opposite shore and including the Lazaretto Roadstead, Seyne Bay, and Little Roadstead. The Great Roadstead comprises Cros St. Georges Creek on the south and Vignettes Roadstead on the north.

Torpedo range buoys.—A torpedo range is marked by the following buoys:

A central float, painted red is moored 560 yards $33^\circ 30'$ from the light on the Grande Jetty.

Two casks, painted white are moored on the bilge, one 132 yards north; the other 132 yards south of the central float.

Two other casks, painted white for the mooring of a raft, are moored 65 yards apart, 2,200 yards 70° from the central float, the distance being measured along the axis of the zone of five.

A torpedo range marked by four white cylindrical iron barrel buoys are moored in Vignettes Road, in connection with the range for the regulation of torpedoes.

The buoys are moored at distances of 100 and 165 yards northward and southward of the firing line on a line perpendicular to the range and 8,800 yards from the firing float.

Cros St. Georges Creek.—From Galette Rock the coast trends to the northwest and westward to Cros St. Georges Creek. It is $\frac{1}{2}$ mile deep with 9 and 10 fathoms water at the entrance, but suddenly shoals to 2 fathoms; it affords anchorage to small vessels with southerly winds, and part sheltered from easterly winds by the pier constructed a short distance eastward of St. Mandrier Hospital, on the eastern side of the cheek, and where there is a small camber with 12 feet depth of water.

A wharf and factories have been or are being erected on the west shore of the bay. A jetty extends northward 100 yards from *Pointe de la Vieille*, the western entrance point of the bay.

Lazaretto Bay is formed by *Piastre Point*, the western extremity of Cros St. Georges Creek, and the point and fort of *Balaguiet*

nearly 1,200 yards 337° from it. The shore between forms to the southwestward a deep shallow bight, with a bottom of sand, mud, and weed, terminating in the beach of Sablettes, the low isthmus connecting the peninsula (of which Cape Sepet is the extremity) to the main. On a line between Piastre and Balaguier Points there are from 9 to $3\frac{1}{4}$ fathoms, and 600 yards within $3\frac{1}{4}$ fathoms. The lazaretto, from which the bay takes its name, is on the shore about 400 yards west-southwestward of Piastre Point, with a camber for landing.

Vessels in quarantine anchor here; anchorage is prohibited eastward of a line between Piastre Point and Tour de Balaguier.

Swinging buoys.—Seven buoys are moored westward of Piastre Point, where vessels adjust their compasses: this part of the bay has been dredged to a depth of 33 feet.

Buoys.—A white buoy is moored 450 yards north-northwestward of Piastre Point; there are also 5 other white buoys in the bay.

Three P. F. (point fixed) buoys are moored off Balaguier Point.

Buoys marked T are for warping; those marked D. P. are reserved for the director of the port; P. F. on buoys mean point fixed.

Lightbuoy—Wreck.—A lightbuoy, exhibiting a fixed white light is moored at a distance of 450 yards 6° from the outer end of the pier situated about 300 yards westward from Fort Eguillette. It marks the southern limit of the area rendered dangerous by the remains of the battleship *Liberté*. The wreck, with upper works above water, lies 820 yards 32° from the extremity of the same wharf.

Telegraph cable beacons.—Two telegraph beacons, painted in blue and white horizontal stripes and with white circular topmarks, stand near Eguillette Fort, and in range bearing 203° indicate the landing place of a telegraph cable. The front beacon stands on the coast, 36 feet above the sea, and is 59 feet from the rear beacon. Anchorage is prohibited in the vicinity of the cable.

Eguillette Point.—About 700 yards northward of Balaguier Point is Eguillette Fort and Point, with rocks extending 250 yards off it.

Buoy.—A black conical buoy lies in $5\frac{1}{2}$ fathoms water, about 300 yards 101° from the fort.

La Seyne Bay and Little Roadstead.—About 1,350 yards 81° from Eguillette Fort, on the opposite side of the bay, is a Fort Grosse tour; between these is the entrance to La Seyne Bay and the Little Roadstead. Eguillette Roadstead is to the northward of Eguillette Fort, the anchorage being about $\frac{1}{4}$ mile from the shore in from 6 to 9 fathoms, mud and weeds. Fort Napoleon, on the heights, about 269 feet above the sea, commands Eguillette Roadstead and Lazaretto Bay.

From Eguillette Point the shore bordered by shallow water trends westward $1\frac{1}{4}$ miles to the commercial basin and town of La Seyne.

The basin is 250 yards in length, more than 100 yards in breadth, with 11 to 18 feet water in it.

The channel to La Seyne has a depth of $29\frac{1}{2}$ feet, and there is the same depth alongside the west quay of La Seyne Port.

A channel 19 to 24 feet deep through the shallow bank leads to the basin, and is marked by buoys. All the inner part of La Seyne Bay is a shallow flat. Tugs may be had. The principal imports are wood and iron. Eastward of La Seyne Basin, on land reclaimed from the sea, are extensive shipbuilding yards with slips and docks, the works of the *Compagnie des Forges et Chantiers de la Méditerranée*, occupying a water frontage of $\frac{1}{2}$ mile, where some of the finest vessels of the French navy have been built, also battleships and torpedo boats for foreign governments, large castings being done at the company's works at Marseille.

From the town of La Seyne the shore trends north and then east, forming several small coves to the artificial harbors of Toulon, which extend round the Little Roadstead in front of the town nearly to Grosse Tour, on the eastern point of the entrance to the inner bay.

Shoal—Buoys.—Dredged material from Toulon Road has been deposited in Seyne Bay. This material has formed a shoal in the form of a quadrilateral, about 500 yards long and 90 yards broad, near the edge of the 2-fathom curve, the center of which lies $1,150$ yards 55° from the entrance to the port of Seyne.

This shoal is marked by six black barrel buoys.

L'Ane Bank—Beacon and buoys.—On the extreme pitch of the point projecting southwestward from Toulon is Grosse Tour, on which is a flagstaff; it is surrounded by a flat of shallow water extending from 200 to 300 yards from the shore, on which, 250 yards 309° from the center of the tower, is Tasse Beacon, of stone, painted black, and surmounted by an iron staff and ball. Outside it, in $8\frac{3}{4}$ fathoms, is a mooring buoy, bearing 250 yards from Tasse Beacon; and a conical red buoy is moored about 150 yards 236° from Tasse Beacon. The west side of l'Ane Bank is further marked by a conical red buoy, in $4\frac{1}{2}$ fathoms, about 530 yards 221° from the center of Grosse Tour. The bank of shoal water (less than 5 fathoms) extends 1,100 yards in a south-southwestward direction from Grosse Tour.

About 300 yards eastward of Grosse Tour is Pipady Point, slightly projecting, and $\frac{1}{2}$ mile farther eastward is Fort St. Louis, with a tower, but smaller than the former, on a point nearly isolated. From this fort the coast is higher as far as Cape Brun, a distance of 1.3 miles. Fort la Malgue, one of the principal defenses of the entrance to Toulon, stands on an eminence near the shore, 600 yards east-northeastward of Fort St. Louis.

Toulon Approach—Fairway reserved for traffic when submarine vessels are exercising.—When the flag with a yellow and a red horizontal stripe is hoisted at the signal stations or on the vessel escorting submarine vessels, to indicate that the latter are exercising submerged, all vessels wishing to enter or leave the port of Toulon are earnestly requested to make use of the fairway, defined below, in which submarine vessels are prohibited from exercising submerged.

This fairway is limited as follows:

On the north, by the alignment of Val Mer and the lighthouse on the southern extremity of Grande Jetty.

On the south, by the alignment of the biological laboratory near Val Mer with St. Mandrier Jetty Lighthouse.

On the east, by a line joining Canier Tower with Cape Brun.

Toulon.—The town of Toulon, Telo Martius of the Romans, is a first-class naval (second only to Brest) and military port. It is somewhat of an oval shape, the longer side facing the sea, rises gradually toward the north, the ramparts extending to the foot of the mountains stretching east and west, which are arid, bare, and totally destitute of vegetation. Toulon is divided into the old and new town; both are tolerably well built, but the streets of the former are narrow and crowded, and all the squares except one are small and irregular. The new quarter, in which are most of the naval establishments, is much superior in appearance. The principal street, the Rue de Lafayette, which intersects the town in its whole extent and is partially planted with trees, is the seat of the market, and presents a scene of great bustle and activity.

The town hall, the old cathedral, three other churches, the courthouse, military arsenal, naval, military, civil, and foundling hospitals, and a handsome communal college are the chief public buildings, but the streets are narrow and the shops inferior. The town is strongly fortified, being surrounded by a double rampart and a large and deep ditch, defended on the east, west, and north by hills covered with redoubts. Among the forts, that of La Malue, to the southeastward of the town, over Vignettes Roadstead, is the most remarkable, not only for its extent but the solidity of its construction. The suburbs are greatly increasing.

Hospitals.—The military hospital at St. Mandrier is a splendid building and has 2,000 beds. There are a civil hospital and two naval hospitals, of which one is at St. Mandrier.

The population in 1911 amounted to 103,549, exclusive of the garrison and a large body of seamen, belonging to reserve naval vessels, who live on shore.

Communications.—Toulon is on the line of railroad between Marseille and Nice, and is also connected by railroad with Hyères

and St. Raphael. Toulon is a port of call for the Orient Line steamers going to Australia and back.

There is a boat to Porquerolles three times a week, the passage taking about $2\frac{1}{2}$ hours. After touching at Porquerolles, the boat goes on to Port Cros, and returns almost immediately to Porquerolles and Toulon.

Consul.—The United States is represented by a consular agent.

Trade.—The principal imports are coal, coffee, iron manufactures, timber, wheat, and wine; the exports, bauxite, cork waste, and scrap iron.

Tugs.—There are a few tugs available.

Supplies—Coal.—About 25,000 tons of coal are imported annually, but no stock is kept in private hands. Coal can be obtained in large quantities from Marseille, by giving three days' notice. A large stock of patent fuel is maintained by the French Government, and the fuel can be obtained by special permission from Paris. Coaling is done from lighters. Fresh provisions are plentiful, but 24 hours' notice is required for large quantities of bread. Good water, which should be filtered for drinking, can be obtained from standpipes placed near the quays, or taken off to vessels in a tank vessel; water is generally supplied free to naval vessels.

Repairs can be executed by the Compagnie des Forges et Chantiers de la Méditerranée, at La Seyne.

Basins and docks—Buoys.—A pier or breakwater is constructed in Toulon Great Road, extending from the coast eastward of Grosse Tour 1,620 yards in a south-southwestward direction, and is intersected at a distance of 150 yards from the shore by a pass about 150 yards in width, with a depth of 9 feet. This channel is marked on the northern side by a white buoy in $3\frac{1}{2}$ fathoms 217 yards southwest of Grosse Tour. The eastern approach to the pass is marked by 2 red buoys.

A pier is also constructed on the southern side of the roadstead eastward of St. Mandrier Hospital, and extends 365 yards from the shore in a 254° direction. A white buoy is moored close to the end of this pier.

There is a pier extending 105 yards from Vieille Point in a 33° direction toward the southern end of the breakwater. A white buoy is moored close to the end of this pier.

Extensive artificial basins, capable of containing a great number of vessels, front the town; they are named Merchant Port, 750 feet long, 510 feet wide, 90 feet width at entrance and $22\frac{1}{2}$ feet depth over sill (between Mourillon and the old town): Old Basin, which is 1,625 feet long, from 390 to 1,160 feet wide, width at entrance 90 feet, and $29\frac{1}{2}$ feet depth on sill; and New Basin. West of the New Basin are Castigneau and Missiessy Basins, and between are the victualling

yard, coal dépôts, arsenal, and dry docks. New, Castigneau, and Missiessy Basins are reserved for vessels of the French Navy, the depths being 33 feet. Missiessy Basin is commanded by Fort Malbousquet on the west, at the foot of which are inclosed timber ponds. The arsenal of Toulon is one of the finest in Europe; it occupies a surface of about 87 acres, and has dry docks and every accommodation for the construction, repair, and outfit of the largest naval vessels.

A petroleum basin is preparing southward of the arm on the western side of Missiessy Basin.

Docks.—See Appendix I.

New Basin. No. 1 dock is 247 feet in length over all, 199 feet on blocks, $59\frac{1}{2}$ feet wide at entrance, and has a depth of $21\frac{1}{2}$ feet over sill. No. 2 dock is 245 feet over all, 189 feet on blocks, $59\frac{1}{2}$ feet wide at entrance, and $22\frac{1}{2}$ feet over sill. No. 3 dock is $292\frac{1}{2}$ feet over all, $207\frac{1}{2}$ feet on blocks, 71 feet wide at entrance, and $25\frac{1}{2}$ feet over sill.

Castigneau Basin.—No. 1 dock is 325 feet in length over all, $250\frac{1}{2}$ feet on blocks, width at entrance $71\frac{1}{2}$ feet, and $25\frac{1}{2}$ feet depth over sill. No. 2 dock is $385\frac{1}{2}$ feet over all, 312 feet on blocks, and $72\frac{1}{2}$ feet wide at entrance. No. 3 dock is 535 feet over all, 484 feet on blocks, and $72\frac{1}{2}$ feet wide at entrance. The two latter have each $27\frac{1}{2}$ feet depth of water over sills. No. 3 dock can be divided into two parts by an intermediate caisson.

Missiessy Basin.—Nos. 1 and 2 docks are each 427 feet in length over all, 375 feet on blocks, $91\frac{1}{2}$ feet width at entrance, and $32\frac{1}{2}$ feet over sills. No. 3 dock is 528 feet in length over all, $91\frac{1}{2}$ feet wide at entrance, and $32\frac{1}{2}$ feet over sill. A fourth dock is proposed.

Extensive building slips occupy the east shore of the Little Roadstead fronting the suburb of Mourillon.

Lights.—An occulting white light, elevated 54 feet above high water, is exhibited from a white iron turret on building, 38 feet high, on St. Mandrier mole head. The light is visible 13 miles.

A red fixed light is shown by the guard vessel. (See Light List.)

Grand Jetty.—A fixed green light, elevated 44 feet above high water, exhibited from a cylindrical white turret with main building, 27 feet high, erected on Grosse tour mole head. The light is visible 11 miles. This light is obscured through an arc of 21° covering the whole of l'Ane Bank. (See Light List.)

A fixed green unwatched light, visible 4 miles, is exhibited at an elevation of 25 feet above the sea from a white turret, 22 feet high, erected on the southern head of the northern portion of the Grosse tour jetty.

A white fixed light southward of the end of the small jetty at Grosse Tour marks two sunken caissons. By day they are marked by a red flag. (See Light List.)

Vieille Pier.—A fixed red unwatched light, elevated 45 feet above high water and visible 5 miles, is exhibited from a cylindrical white turret on main building, 27 feet high, erected on Vieille mole head.

Old Basin.—A fixed red light, visible 2 miles, at an elevation of 19 feet above the sea, is exhibited from a brown iron post on the West Pier Head of Old Basin. (See Light List.)

A fixed green electric light, visible 1 mile, exhibited on the eastern side of the entrance to the Old Basin (Chaine Vieille).

The light is exhibited at the same height as the red light on the opposite side of the entrance and is obscured over the shoals southward and eastward of the entrance. (See Light List.)

Merchant Port.—A fixed red light, visible 2 miles, at an elevation of 12 feet above the sea, is exhibited from a brown iron post on the North Pier Head of Merchant Port. (See Light List.)

La Seyne Basin.—A small fixed green light, elevated 13 feet above the sea, is shown from a post on the extremity of the West jetty at the basin at La Seyne, visible about 2 miles in clear weather. (See Light List.)

Time ball.—A black ball, 2 feet in diameter, is hoisted five minutes before the signal at the signal staff of the Naval Observatory, 120 feet above the sea and 107 feet above the ground; it is dropped 6 feet by hand at 22h. 0m. 0s., Greenwich mean time. The ball is immediately rehoisted and the signal repeated at 22h. 2m. 0s., Greenwich mean time.

If the signals are incorrect, the ball is rehoisted as quickly as possible after the second signal, and kept up for 5 minutes if the first signal is incorrect, for 10 minutes if the second signal is incorrect, and for 15 minutes if both signals are incorrect. These are not to be regarded as time signals.

A red and white triangular flag is hoisted on a small yard near the ball on the 10th, 20th, and 30th or 31st days of each month when observations have been made on the previous evening. If hoisted on other days it signifies that the apparatus is being adjusted.

Radio.—A radio station has been established at Toulon Naval School; call letters F. U. E. This is a naval station, but is open in case of distress only.

Prohibited anchorage.—Anchorage is prohibited within the following boundaries:

(a) On the north, a line drawn from the tower on Balaguier Point in a 90° direction for a distance of 1,920 yards.

(b) On the east, a line drawn in a 147° direction for a distance of 1,550 yards from the eastern extremity of limit (a).

(c) On the south, a line drawn from the northern (cliffy) extremity of Piastre Point in a 96° direction to the southern extremity of limit (b).

(d) On the west, a line drawn from Piastre Point to the southern angle of Balaguier Fort.

Little Roadstead—Lights established to mark harbor works.—Two fixed red lights are shown from pile structures, each with board painted in red and white checkers as topmark, situated, respectively, at 420 yards 230° and 320 yards 228° from the light on the western side of the entrance to Old Basin.

Anchorage.—Although there is anchorage under different circumstances in the several roads of the bay of Toulon, that most resorted to is the Little Roadstead, off the town, where there are depths of 6 fathoms, mud, sheltered from all winds.

The Little Roadstead has been dredged to a depth of 6 fathoms as far westward as the buoys opposite Milhaud; it is not proposed to go any farther.

Vessels entering through the northern opening in the breakwater (in which there is only a depth of 9 feet) should steer for the buoy marking Eguillette Shoal, or the fort, on the point, and not stand to the northward into the Little Roadstead until well clear of the shoal water which extends westward of Grosse Tour.

The Frères Islets just shut in with Fort Balaguier (the islets are seen over the low beach of Sablettes) clears Tasse Beacon and the flat which extends nearly 300 yards from the shore northwestward of the Grosse Tour.

Vessels entering the anchorage off St. Mandrier (Cros St. Georges Creek) must moor southward of the line between the outer extremity of the pier off Vieille Point and the inner extremity of the pier of St. Mandrier, the latter bearing about 95° .

Vessels wishing to moor in Lazaretto Roadstead must keep westward of the line between Piastre Point and Balaguier Fort.

Naval vessels should not enter Petite Rade until an official has been sent from the station of Jetée de St. Mandrier to point out the anchorage.

Merchant vessels have no right to use the mooring buoys.

Vessels seeking shelter anchor in Rade de l'Eguillette.

Vessels about to enter, or on leaving, Port de la Rode, may anchor, at a less distance than the vessel's length, from the point of the bastion between the port and Darse Vieille.

Anchor in Anse du Creux St. Georges southward of the line from Piastre Point through the outer end of the Jetée de la Vieille.

Anchor in Baie du Lazaret southwestward of the line between Piastre Point and Balaguier Fort.

Vessels proceeding to the Little Roadstead, and not intending to anchor in either La Seyne Bay or Merchant Port, must moor in Eguillette Roadstead, keeping north and west of the buoy marking the shoal of that name.

Mooring buoys.—The number of mooring buoys for naval vessels in the Inner Roadstead is 23; they are numbered from 0 upward. There are also 7 buoys for the adjustment of compasses and several others for the use of tugs, etc.

A mooring buoy, showing a red light at night, is moored 218 yards 21° from the red light at the entrance to the Old Basin.

Great Road.—Vignettes Road, between Grosse Tour and Cape Brun, affords shelter with good holding ground from all but southerly winds. The shore is all along bordered by a bank, 250 yards off; southward of the southeast angle of Fort la Malgue is a shoal with $1\frac{1}{2}$ fathoms water.

A good berth will be found, in 9 or 10 fathoms water, southward of Fort la Malgue with Pipady Point in range with Mount Six-Fours, and Tour Mourillon of seven stories and conspicuous, bearing about 326°.

Mooring buoys.—Three mooring buoys have been placed in the Great Road in the following respective positions: A mooring buoy 1,450 yards 89° from Grosse Tour Pier Light. A mooring buoy, painted white and marked 1B, 2,490 yards 43° from St. Mandrier Jetty Light. A mooring buoy, painted white and marked 2B, established 2,250 yards 34° from the above light. Two white cask buoys for torpedo practice are moored in Vignettes Roadstead, 920 yards 232°, and 950 yards 228°, respectively, from the flagstaff on Cape Brun Fort.

Cape Brun, 56 feet high, is dark, bold, projects southward, and has a fort and battery on it; Capes Brun and Sepet form the entrance to the Great Roadstead, which is bounded on the west by the *Jetée de la Grosse Tour*.

From Cape Brun the coast eastward forms two small shallow coves (Mejean and Magot), the latter being studded with rocks; at the distance of 1 mile is St. Marguerite Point (not so high as the cape) and fort. The coast between the cape and point is bold and steep-to, except in the bays.

Carqueiranne Point is a steep reddish rock, with trees on its summit; it is commanded by high land named Le Col Nègre, 984 feet above the sea. The coast between the two points forms a bay, and is bordered at the distance of nearly 200 yards by a shallow bank and rocks.

Directions.—Coming from the southward the heights on the coast around Toulon form somewhat the appearance of an archipelago. The principal points distinguished are Cape Sicié, le Col Nègre, over Carqueyranne Point, the bare red peaks of Mount Faron immediately northward of Toulon (elevated 1,709 feet), the peninsula of Giens, which terminates to the southwestward in high cliffs at Escampobariou Point, and finally Cape Sepet and the lighthouse

on Rascas Point, but do not mistake Cape Sicié for Cape Sepet, the latter shows up as comparatively low land, while the former is high, and is apt to be taken for the point of land about 10 miles to the westward. The currents in the offing generally set to the southwestward, and near the coast to the westward, more particularly with southeast and easterly winds; vessels should therefore keep to windward of Toulon, as in the event of a calm or a heavy sea it may be difficult for a sailing vessel to reach the port, if to leeward of Cape Sepet. On entering Toulon Bay give either shore a prudent berth and steer for the southern extremity of the breakwater de la Grosse Tour, then having passed the pier of St. Mandrier at a convenient distance, a mid-channel course between the end of breakwater and pier at Vieille Point, the depth being 15 fathoms.

By night the lights will be a sufficient guide.

At 1,000 yards 196° of Grosse Tour and 700 yards 345° from the southern extremity of the breakwater is a shoal of soft mud and weed, on which is a depth of $4\frac{1}{2}$ fathoms; it is not dangerous to vessels of moderate draft.

From the entrance steer to pass westward of the extremity of l'Ane bank or with Fort Eguillette a little on the port bow, until les Frères, seen over the low sandy neck les Sablettes, are shut in with Fort Balaguiet; this latter mark leads to the eastward of the black buoy off Eugillette Point, and into the Little Roadstead clear of Tasse Shoal, and a vessel by standing on for the middle of the town may anchor as convenient, or proceed into any of the artificial harbors. Naval vessels usually take up moorings off the arsenal, which are attached to large white buoys and readily seen.

Pilots are not compulsory at Toulon; the usual signal will promptly obtain one, vessels being boarded in the Great Road.

Winds.—The prevailing winds and those which blow with the greatest violence on this coast are from northwest to west, and vessels are often unable to carry sail. With these winds, vessels should at once take advantage of any convenient anchorage.

Barometer, etc.—The mean annual height of the barometer, as derived from nine years' observations, is 29.99; the mean monthly height in March, April, and May (the lowest) is 29.93; in September (the highest) 30.02. The mean annual temperature is 59.6° ; the mean monthly temperature in January (the lowest) is 45.5° ; in July (the highest) 74.3° . The average annual rainfall is 27.83 inches; rain falls on 78 days in the year. The climate is said to be dry and bracing, though exposed to the mistral.

Escampobarliou Point is high, rugged, bold, and steep-to, and forms the southwestern extremity of the peninsula of Giens. The point should not be approached too closely, as near it there are often violent squalls off the land, calms, eddy currents, and a confused sea.

Semaphore.—There is a semaphore on the summit of the point 420 feet above the sea.

The Gulf of Giens, between Carqueyranne and Escampobariou Points is 3 miles deep, in the form of a semicircle, and open to the west; it terminates in a low, narrow beach, which separates the sea from the étang de Giens and the salt works of Pesquiers, which, with the beach in the bay of Hyères, unites the peninsula to the main. There is a chapel on the north side of the gulf. Shallow water extends nearly 1 mile from the beach.

Peninsula and road of Giens.—The peninsula of Giens extending east and west $3\frac{1}{2}$ miles, is connected to the main by a sandy isthmus $2\frac{1}{2}$ miles in length, in the middle of which is the lake above mentioned.

The peninsula is high and uneven, with a castle on its summit and other buildings in ruins; several islets and rocks lie off the north-western end. The roadstead of Giens, on the northwestern side of the peninsula, affords shelter from all but westerly and southwest winds, in 6 fathoms, sand and weeds. It is somewhat protected from the latter winds by the islets and rocks which lie close off the north-western end of the peninsula; and vessels anchoring in the roadstead should pass outside these islets. Of the various points which form the southern coast of the peninsula the two most remarkable are Morts and Terre-Rouge. Both are foul, and between them is Niel Bay, in which is a small jetty, and over which is the castle. The coast is skirted by rocks and reefs. Terre-Rouge Point, the eastern extremity of the bay, is $2\frac{1}{4}$ miles from Escampobariou Point.

Salettes—Light.—At Port Salettes, on the northern side of the Gulf of Giens, a fixed red light is shown, at an elevation of 24 feet, from a metal column 18 feet in height, situated on the head of the jetty.

Telegraph beacons.—Three beacons, forming two alignments indicating a sector within which telegraph cables are landed, are erected on the southern side of the Giens peninsula. The first alignment, to the left of which anchorage is prohibited, is formed by two beacons painted in blue and white horizontal bands; the front beacon, with white rectangular topmark, 33 feet high, is near the sea, and the rear beacon with white disc topmark is situated 52 feet 290° from the front beacon.

The second alignment, eastward of which anchorage is prohibited, is of a front beacon, surmounted by a white triangle, and the rear beacon of the first alignment, situated 77 feet 343° from the front beacon.

Fourmigués Rocks, lying $1\frac{1}{2}$ miles 303° from Escampobariou Point, are two black rocks, 21 and 46 feet high, of which the southern is the largest. There are 10 fathoms water close to the southward

of them and 23 fathoms between them and the islets off the northwest face of the peninsula.

Ribaud Islands.—About $\frac{1}{2}$ mile to the southwest of Terre-Rouge point is Great Ribaud Island, 165 feet high, of a triangular form, and about 700 yards in extent northwest and southeast; its southwest side is bold and clear of danger, but off its southern extremity is a rocky patch of 5 feet water. Between the island and Terre-Rouge Point is Little Ribaud Island, 59 feet high, northward of which is Ribaudon Islet, 19 feet high, with reefs, which form between them and those extending from the point, a narrow channel in which is a depth of 13 feet about midway. The channel between the reefs skirting the northern side of Great and Little Ribaud Islands is about 200 yards wide, with 16 to 19 feet water, and is used by small coasting vessels bound to Hyères Road. The deepest water is on the side of Little Ribaud.

Light.—An occulting white light, elevated 112 feet above the sea and visible 16 miles, is exhibited from a white square turret with main building, 39 feet high, situated on Great Ribaud Island.

Buoys.—Two mooring buoys, painted white, are moored in a 157° direction from the small islet off Cape Esterel, distant 700 yards, and two similar buoys in the southern part of Hyères Road at about 1 mile northward of the northern extremity of Porquerolles Island.

Cape Esterel and Pradeau Roadstead.—Cape Esterel, forming the eastern extremity of Giens Peninsula, is low, and nearly united to it is an islet of the same name, 26 feet high, but there is no passage between. On a narrow projecting point, about $\frac{1}{2}$ mile eastward of Terre-Rouge Point, is Fort Pradeau, which defends the roadstead of the same name. The roadstead is between the fort and cape, and with off-shore winds affords anchorage in 6 or 7 fathoms, sand and weeds; the fort bearing about 275° and the cape 44° 30'.

Hyères Road.—About $7\frac{1}{2}$ miles 64° from Cape Esterel is the islet and fort of Brégançon. The land between forms a large bight, named the bay or roadstead of Hyères, $3\frac{1}{2}$ miles, deep, extending to the northwestward, and containing several anchorages.

The western shore of the bay is formed by the low sandy isthmus previously mentioned as joining the peninsula of Giens to the mainland. Low, flat land also forms the northern shore, but the eastern is hilly. At about $4\frac{1}{2}$ miles northward of Cape Esterel is the small Gapeau River, 3 miles 283° from the entrance to which is the town of Hyères.

The town of Hyères, situated on the southern slope of a hill crowned by ruins, commands beautiful and extensive views, but its streets are steep, narrow, crooked, dark, and badly paved; on the outskirts, however, are several hotels and many pretty villas. On its highest part are the ruins of an ancient fortress, from which

descend on either side the traces of a line of thick walls which formerly surrounded the whole town. It is said that Hyères was formerly a seaport; at present the plain between it and the sea is covered with orange plantations, vineyards, and olive grounds. The town, contained in 1913 a population of about 21,339; has manufactures of orange-flower water and other perfumes, brandy, oil, silk twist, and a trade in olives, fruit, salt, and wine. Under the name of *Arcae* it was one of the colonies anciently established by the Greeks on the shores of the Mediterranean; the Romans called it *Hieros*.

The mildness and dryness of the air cause it to be much frequented by invalids in winter.

At $3\frac{1}{4}$ miles eastward from the mouth of the Gapeau is *Argentiere Point*, the commencement of the high land on the eastern shore of Hyères Bay. From the point the coast trends about southeastward, forming several points and bays, as far as the islet and fort of *Brégançon*. This latter part of the coast has one or two islets near it and several rocky patches about $\frac{1}{4}$ mile off.

Fort Brégançon.—The islet of *Brégançon* is circular, rocky, and steep on all sides, and is connected to the shore by a bridge. A fort occupies nearly the whole of the island.

Anchorage.—Hyères Bay is most exposed to southeast and southwest winds, which send a heavy sea through the Great and Little Passes and offshore winds are at times very violent; there are, however, several good anchorages for vessels of all classes.

Badine Road, about 1 mile to the northeastward of Cape Esterel, affords excellent shelter from all westerly winds, in $6\frac{1}{2}$ or 7 fathoms, sand and mud. The anchorage takes its name from *Badine Point*, which is about $\frac{1}{4}$ mile northwestward of the cape.

Between this anchorage and the shore there is a bank which extends about 1 mile to the northward of *Badine Point*, with depths of from $3\frac{1}{4}$ to $4\frac{1}{4}$ fathoms.

Life-saving station.—A mortar life-saving apparatus is established at *Pasquiers*.

Torpedo range.—There is a torpedo range in *Rade de la Badine*, and it is marked thus: A mooring buoy lies about $\frac{1}{4}$ mile northeastward of *Cap de l'Esterel*, with four buoys placed 250 yards northeastward, southeastward, southwestward, and northwestward of it. Four pairs of buoys lie 1,100 yards, 1 mile, 2.2 miles, and 3.3 miles northward of the mooring buoy.

Beacons.—Two wall beacons, painted half white and half red, are situated on the shore near *La Plage* railroad station, and a similar beacon at the entrance to *Ruisseau le Roubaud*, on *Le Ceinturon Beach*, about 1 mile northeastward; there is also a black square painted on the railroad bridge over the stream. They mark a

measured base for ascertaining the speed of torpedo vessels; each end is also marked by a white buoy.

Salines Anchorage, so named from the salines which are a little north of the mouth of the Gapeau River, is with northeasterly winds the best in the Bay of Hyères. A berth will be found southward of the buildings on the beach and eastward of the mouth of the river, in 6 or 7 fathoms, mud, with the outer Saignet Islet in range with the eastern coast of Porquerolles Island and Blanche Point and Brégançon fort in range; moor southwest and northeast. The head of the bay is surrounded by a low beach and marshy land.

Between the Gapeau River and Fort Brégançon on the parallel of the latter, or about $1\frac{1}{4}$ miles from the shore, is the anchorage for large vessels in from 9 to 11 fathoms, mud and weeds; or anywhere between the meridians of the Salines and Argentièr Point. Merchant vessels anchor about 1 mile southward of the point. To the northward of Gapeau redoubt (northeast of the entrance to the river) will be seen heaps of salt in the form of pyramids, some white and others of a ruddy color.

There is also anchorage sheltered from northeast winds, in 8 or 9 fathoms, about 700 yards to the northwestward of Fort Brégançon.

Port Pothuau.—This small port is formed by two jetties; there are 11 feet of water at the entrance, with less water inside; it is principally used for torpedo craft. The landing place is at the piers near the salt works, where there is a battery.

Light.—A fixed green light is exhibited, at an elevation of 23 feet above the sea, from a post on the end of the east pier at Salines d'Hyères, or Port Pothuau. Visible 3 miles. (See Light List.)

Mooring buoys.—Several mooring buoys lying southward of Port Pothuau are reserved for naval vessels.

Communication.—There is a branch line of railroad from Toulon, Marseille, and Nice.

Supplies.—Water may be obtained from the river. The French Government has a small platform and cistern where their vessels can obtain water at all times when the river is dry.

Cape Benat.—From the islet of Brégançon the coast is moderately high, sinuous, and trends east-southeastward to Blanche Point, at $\frac{1}{2}$ mile northeastward of which is Cape Benat. The cape is formed by two low points surrounded by rocks projecting to the eastward and southeast.

Semaphore.—Over the cape is Mount Fourches with a semaphore on it 604 feet above the sea, and close to the cape is Cristaux Islet, 39 feet high.

Light.—A flashing red light is exhibited, at an elevation of 198 feet above the sea, from a white masonry tower 41 feet high near the

battery on Blanche Point. The light is visible seaward 20 miles. (See Light List.)

Measured distance.—A distance of 6.71 miles, for testing the speed of large vessels, is measured on a line joining Great Ribaud Lighthouse and Cape Lardier on a 68° and 248° bearing.

The east end is marked by a line drawn from a white beacon on Cristaux Island to a black and white mark, surmounted by a small beacon, on the small point situated southward of Esquilette Point.

The west end is at a point where an iron beacon, surmounted by a black ball, situated on Petit Sernaiguet, is in range with a similar beacon on le Gros Mur Point.

Batterie des Maures.—An artificial islet, 20 feet high and steep-to, surrounded by depths of 5 fathoms, and known as Batterie des Maures, has been constructed of a block of concrete, 90 feet long and 40 feet broad, and is used in connection with a torpedo range.

It is situated in a position from which the southern extremity of Cape Léaube bears 123° , 600 yards.

Lights.—A fixed white light, elevated 41 feet and visible 4 miles, is exhibited from Batterie des Maures.

A fixed red light, elevated 13 feet, is exhibited from the outer end of a pier, situated on the northern shore of the bay, at a distance of $1\frac{1}{2}$ miles 292° from Batterie des Maures, and visible 2 miles.

Buoys.—Range buoys, placed in pairs, are situated at distances of 220, 640, 1,080, 1,620 yards; 1.1, 1.6, and 2.2 miles, respectively, $266^{\circ} 45'$ from Batterie des Maures.

The buoys in each pair are 100 yards apart.

Mooring buoy.—A central mooring buoy is established in a position 188° from Fort Brégançon, distant 1.17 miles; four other mooring buoys are situated at a distance of 320 yards $44^{\circ} 30'$, $134^{\circ} 30'$, $324^{\circ} 30'$, and $314^{\circ} 30'$, respectively, from the central buoy.

Prohibited anchorage.—When torpedo practice is in progress a red flag will be hoisted at Batterie des Maures and on the western target buoy, or on a boat anchored in the direction of the firing. During the practice it is forbidden to stop, fish, or navigate within the space defined by the undermentioned limits.

(a) On the north, by a line drawn from Léaube Islet, in a 267° direction, to a black beacon on the western shore of the bay.

(b) On the south, by a line drawn from the northern Estagnol Islet, in a 270° direction, to a red and white beacon on the western shore of the bay.

(c) On the west, by a line drawn in a 172° direction from the southernmost house in the village westward of Le Bastidon to the Rochers des Mèdes, Porquerolles Island.

(*d*) On the east, by a line drawn from the chimney situated about 1 mile northward of Bormettes, in a 141° direction, through Batterie des Maures.

Trippe Point—Telegraph.—A submarine cable is landed in the cove eastward of this point, the position being marked by two beacons, painted blue and white in horizontal bands, with white circular topmarks. These beacons, when in range, bearing about 0° (north), lead eastward of the line of cable.

Cape Bénat—Telegraph beacons.—Two alignments of beacons indicating a sector within which telegraph cables are landed have been established at Cape Bénat (Baie de la Trippe). The first alignment, 320° , to the left of which it is forbidden to anchor, is formed by two beacons painted in blue and white horizontal bands; the front beacon, with white rectangular topmark, 26 feet high, stands on the beach; the rear beacon, with white round topmark, is situated about 30 feet 320° from the front beacon.

The second alignment, 14° , to the right of which anchorage is prohibited, is formed by the rear beacon of the first alignment, and a front beacon, with white triangular topmark, situated 194° , 36 feet from the rear beacon.

Hyères Islands—Gun-practice areas; signals, etc.

Gun-practice areas.—Gun practice by naval vessels in the vicinity of the Hyères Islands will be carried out within two areas, the limits of which are described below:

1. Western area:

(*a*) On the north, by the coast comprised between Port Pothuav and Cape Bénat.

(*b*) On the east, by the meridian of Cape Bénat.

(*c*) On the west, north of Porquerolles, by a line joining Cape d'Arme Lighthouse with Port Pothuav Lighthouse; south of Porquerolles, by the meridian of $6^{\circ} 10' E$.

(*d*) On the south, by the parallel of $42^{\circ} 55' N$.

2. Eastern area:

(*a*) On the north, by the coast comprised between Cape Négret and Cape Camaret.

(*b*) On the east, by the meridian of Cape Camaret.

(*c*) On the west, by the meridian of Cape Négret.

(*d*) On the south, by the parallel of Titan Lighthouse.

Signals, etc.—BY DAY.—Gun practice with shell, in either of the above-mentioned areas, will be indicated, by day, by a red square flag hoisted at the masthead of the Commercial signal mast at Porquerolles, Giens, Titan, and Cape Bénat signal stations. The flag will be hoisted half an hour before the commencement of the practice, and will remain flying until its conclusion. This flag is also hoisted on Cape des Mèdes.

Vessels should avoid passing through either of the areas defined above while gun practice is in progress and in every case must obey the orders received from the gunboats patrolling the danger zone.

BY NIGHT.—No signal is made, by night, from the signal stations to indicate that gun practice is in progress, but the vessels firing will each carry, in addition to the usual navigational lights, a red light at the masthead.

The targets will not be marked by any light, and they may be anchored, drifting, or in tow; in the last case the tug will carry the regulation navigational lights; the tow rope may be over 1 mile in length.

Should a vessel, not noticing the searchlights of the naval vessels, inadvertently enter either of the above-mentioned areas while firing is in progress, she should pass at least 3 miles astern of the tug towing the targets.

The last vessel firing will signal the conclusion of the practice by the discharge of four red rockets singly at intervals of 20 seconds, followed 2 minutes later by a sheaf of white rockets.

When gun practice is being carried out from Levant Island, the red flag will be hoisted at the signal stations mentioned above.

The Hyères Islands are six in number, including Great and Little Ribaud, already mentioned; eastward of these are Porquerolles, Bagau, Port-Cros, and Levant. They extend nearly east and west in front of Bay of Hyères and to some extent shelter it from the southward.

Porquerolles Island, 4 miles in length, east and west, and about 1 mile in breadth, is of an irregular form and 503 feet high, rugged and bold on the south and east; it is almost entirely covered with woods of pine and oak. It is $1\frac{1}{4}$ miles from the peninsula of Giens, and between the islets off its western end and Great Ribaud Island is the Petite or Little Pass, about $\frac{3}{4}$ mile wide, with from 11 to 20 fathoms water. Grand Langoustier Point, the western extremity of the island, is low, with a fort on it; a chain of islets and reefs extends about $\frac{1}{2}$ mile northward of the point, on the extremity of which is a red and white horizontal striped beacon surmounted by a topmark consisting of two reversed cones, 28 feet high. A fort is situated on the next rock toward the shore. In steering through the Little Pass keep in mid-channel; if working through give a berth to the dangers on either side.

Roads.—The roads in the island are all military roads and in good condition. The water supply of the island is bad.

The basse Langoustier, a shoal of $5\frac{1}{2}$ fathoms, and on which the sea breaks with winds from the offing, lies 500 yards 272° from Langoustier Point.

Semaphore.—There is a semaphore on the summit of Porquerolles Island.

Radio.—An experimental radio station has also been established, open only in cases of distress. The call letters for the radio station are F F P.

Light.—A group flashing white light is exhibited 262 feet above the sea from a square white tower on the high land $\frac{1}{2}$ mile eastward of Cape d'Arme, southern side of Porquerolles. The light is visible 23 miles. (For limits of visibility see Light List and chart.)

Gros and Petit Seraignet Islets.—About $2\frac{1}{4}$ miles eastward of the lighthouse is the islet of Gros Seraignet, only a short distance from the coast, the passage between being only fit for boats. One-quarter mile southeastward of Gros Seraignet is Petit Seraignet. The two islets are high and bold, with rocks around them, and in the middle of the channel between them there are $5\frac{1}{2}$ fathoms water. Vessels should pass a prudent distance outside them.

Rochers des Mèdes.—From Gros Seraignet Islet the coast of Porquerolles, which is high, rugged, and bold, trends to the northward to Cape de Mèdes, the northern extremity of the island. About 200 yards northward of the cape are three high rocks of the same name, with a reef extending from them; the channels between are used by fishing boats.

Beacons.—Two black beacons, each surmounted by a sphere, stand, one on Petit Sarranier, and the other on Pointe le Gros Mourre, on the coast $1\frac{1}{4}$ miles to the northward; the beacons marked an old measured distance.

Anchorage.—The north coast of Porquerolles is lower than the south, and forms two rather deep bays with beaches, separated by le Quin Point. East of le Quin Point is Fort Alicastre, and at the head of the west bay is a castle and village. Both bays are frequented by coasters for shelter from southerly winds; but the larger and most convenient is the western, anchoring northward of the castle, about 600 yards from the shore in 4 fathoms water. Large vessels anchor in $6\frac{1}{2}$ or 7 fathoms, sand and mud, with the castle about 185° and the Mèdes Rocks in range with Cape Bénat.

Light.—A fixed red light, elevated 20 feet above the sea, is exhibited from a pole over a shed on the pier end in Porquerolles Road. Visible 3 miles. (See Light List.)

Buoys—Wreck.—A white mooring buoy lies about 200 yards northward of the northern Rocher des Mèdes. Two white buoys lie about 1 mile north-northwestward of the northern Rocher des Mèdes, and about 200 yards southward of them is a wreck.

Caution.—Gun-firing, see page 37.

A white buoy is moored about 100 yards northward of Bon Renaud Point and another white buoy $\frac{1}{4}$ mile westward of Le Quin Point.

Life-saving station.—A gun life-saving apparatus is established at Porquerolles.

Bagau Island.—About $4\frac{1}{2}$ miles 185° from Cape Bénat, on the main, is the northern end of Bagau Island. This island is $\frac{3}{4}$ mile in length north and south, $\frac{1}{4}$ mile in breadth, 167 feet high, and is $4\frac{1}{4}$ miles 84° degrees from the southeastern point of Porquerolles. There are fortifications on the island.

Grande Passe.—Between the two is the Grande or Great Pass of the Hyères Islands. In the middle of the passage there are from 25 to 45 fathoms water and close to Bagau 8 to 10 fathoms. A small rocky bank of 11 fathoms, *sèche du Milieu*, lies $1\frac{1}{4}$ miles 106° from Petit Sernaiget. The channel being broad and clear, with the exception of the Sernaiget Islets near Porquerolles, there is no difficulty in its navigation by night or day.

Great Pass—Target-mooring buoys.—Target-mooring buoys are moored in the following positions in the Great Pass: At distances of 2,050, 2,250, 2,800, and 3,020 yards 94° , respectively, from Galère Point, Porquerolles Island.

Port Cros Island lies $\frac{1}{4}$ mile to the southeastward of the southern end of Bagau Island. Malalongue Point is the western extremity of Port Cros Island. This island, the highest of the Hyères, is about $2\frac{1}{2}$ miles in length east and west, 1.3 miles in breadth, rugged and of irregular form, its highest part being to the southeastward, where it is 678 feet above the sea. The northern point is named Galère and the eastern Port-Man; the latter has two little islets off it, which nearly join. At 400 yards off the southern side is Gabinière Islet, rugged and 206 feet high, with 12 fathoms between it and Port Cros.

Port Cros Cove, on the northwestern side of the island, is about 400 yards wide at the mouth and the same deep, having a village and an old fortified castle on its northeastern shore. Above the village are the two forts Estissac and Eminence, the latter 433 feet high. The anchorage off the cove is in from 9 to 14 fathoms, sand and mud. In entering with easterly winds vessels should be prepared for squalls and eddies from off the land.

The soundings decrease gradually to the head of the cove, where there is a bank of soft mud, on which a vessel can ground without danger. Water can be had from wells dug on the beach, but there are no other resources.

Anchorage.—The anchorage of Port Cros affords excellent shelter, excepting with winds from the northeast or southwest, and is accessible to large vessels. It is formed by the eastern side of Bagau

Island and the western side of Port Cros. The northeast entrance is 1,400 yards wide; the southwestern entrance is somewhat less than 400 yards, being narrowed by rocks off the points on either side. This latter channel can be taken with favorable winds by keeping in mid-channel, where there are 11 fathoms water.

Telegraph cable beacons.—A submarine cable is landed in the cove southward of Rascas Rock, the position being marked by two beacons, painted blue and white in horizontal bands, with circular white topmarks.

These beacons, when in range bearing 150° , indicate the direction of the cable. Anchorage near this line is prohibited.

Port Man, at the northeastern end of the island, is larger than the above cove, being 500 yards wide at the entrance and 800 yards deep, with 14 fathoms water at the entrance, shoaling to 2 fathoms near the beach at its head. It shelters from the northwest round south to southeast, but it is difficult for a sailing vessel to enter with southerly winds, in consequence of squalls from off the high land; with northwest winds it is easy of access, as the coast is clear and bold. The anchorage is in 3 or 4 fathoms. On the northeast islet, on the eastern side of the entrance, is a fort in ruins; there are no inhabitants or any resources.

Between the northern extremity of the island, Galère Point, and the east point of entrance to Port Cros, Moulin Point, the coast is bold and clear. Rascas Islet, low and black, is connected to the coast by a reef, forming a small calangue (bay) open to the westward.

Levant Island.—A little more than $\frac{1}{2}$ mile eastward of Port Cros Island is the western end of Levant Island. The island is $4\frac{1}{2}$ miles in length 50° and 230° , about $\frac{3}{4}$ mile in breadth, 457 feet high, and irregular in form; its southwestern point is named Maupertuis, and the northeastern Calerousse. The island was formerly used as a penitentiary for boys.

Passe des Grottes.—Northward of Maupertuis Point is Rousse Point, the intermediate coast being high and bold, and with the opposite shore of Port Cros forms the Passe des Grottes. The passage is obstructed by a rocky shoal, awash, named Chenal Bank; its shoalest part (la Dame Rock) is marked by a black stone beacon, 28 feet high, surmounted by a cylinder. The shoal lies 900 yards southward of the fort of Port Man and 300 yards from the coast of Port Cros; it is steep-to. Vessels taking this channel, which should only be done with a fair wind, should keep toward the coast of Levant Island, which is bold and clear of danger.

From Rousse Point the land trends eastward and northeastward to Castelas Point; the intermediate coast forms a bay, which is only convenient for small vessels with off-shore winds, anchoring very near the land in from 5 to 8 fathoms water. The whole of the north-

western side of the island is bold and clear of danger, except a reef extending from the central point of the bay.

At 800 yards southward of Calerousse Point is a lighthouse, and to the southwestward is Reste Point; thence the coast trends westward and southwestward, forming a bay, as far as le Grand Cap. At the head of the bay, about $\frac{1}{2}$ mile westward of Reste Point, is a small cove named Titan, used by fishing boats. A tower stands on the eastern point of entrance, and about $\frac{1}{2}$ mile southward is a bank, Séche du Titan, with 7 fathoms water on it. Westward of le Grand Cap is Maupertuis Point, with a shoal of 4 fathoms close to it. The intermediate coast is high and bold, with a deep indentation to the northward in the center.

Titan Light.—A flashing white light is exhibited, at 229 feet above the sea, from a circular white stone tower, with main building having a square tower, all white, 23 feet high, on the eastern point of Levant Island. The light is visible 21 miles. (See Light List.)

Semaphore.—At 440 yards 315° from the lighthouse, elevated 364 feet above the sea, is a semaphore station.

Esquillade Rock and Beacon.—One mile eastward of the lighthouse is an islet or rock named Esquillade, upon which is a beacon tower 28 feet high painted in red and black horizontal stripes and surmounted by a sphere; and about 200 yards westward of the tower is a shoal with $\frac{1}{2}$ fathom water on it; between the two is a depth of 11 fathoms. At 200 yards eastward of the lighthouse is another rock, from which a reef extends a short distance to the northeast. Between this rock and the shore there are 12 fathoms, and between it and Esquillade 25 fathoms.

With the exception of the dangers above mentioned the island of Levant is steep-to; at less than 1 mile from its northern coast there are 100 fathoms water, and the same about 2 miles from its southern coast.

Caution.—The island of Levant on the south, and Cape Bénat on the north, form the principal passage from the eastward to the bay of Hyères, which is about 5 miles wide. The Hyères Islands break the sea from the southward, but in the several channels between them there are strong currents caused by the prevailing winds; it is necessary, therefore, to be cautious when navigating through them, or in their vicinity.

Lavandou is a pleasantly situated resort, with a population of about 900; there is a profusion of lavender on the hills near it.

Light.—The fixed white light at Lavandou is shown from a post situated 44 yards from the end of the pier. (See Light List.)

Communication.—Le Lavandou is on the Joulon, Hyères, and St. Raphael Railroad, which runs for considerable distance along the coast.

Esquillette Point, on the mainland $\frac{1}{2}$ mile northward of Cape Bénat, is low and projects eastward; a ledge of rocks, of which some are covered and others above water, extends nearly 400 yards from the point.

Bormes Road.—From Esquillette Point the coast trends northward to the village of Lavandou, thence eastward to Nervio Point and forms two bays with sandy beaches. The anchorage off these bays is named Bormes Road, from the town of that name on rising ground $1\frac{1}{2}$ miles inland. Bormes is rendered conspicuous by its churches and mills; a population of about 2,000.

Light.—A small fixed white light is shown at Lavandou, from the end of the pier.

Should this light not be exhibited owing to bad weather a fixed red light will be shown from the beach westward of Lavandou. (See Light List.)

Life-saving station.—There is a life-saving station at Lavandou.

Mark.—There is a white mark on Pointe du Nard Viou, used in connection with a measured mile.

Gouron Bank.—One mile southward of Nervio Point is the center of a rocky bank about 600 yards in extent north and south, on which are from 6 to 9 fathoms water. Elsewhere the bottom is sand, shells and patches of weeds, with from 5 to 6 fathoms at 400 yards from the shore.

Fourmigue Islet, $1\frac{1}{2}$ miles 61° from Cape Bénat, and about $2\frac{1}{2}$ miles 146° from the village of Lavandou, is a round-pointed islet 13 feet high and only 150 feet across, surrounded by sunken rocks. Between it and Esquillette Point, a distance of $1\frac{1}{2}$ miles, there are from 16 to 23 fathoms.

Beacon.—A beacon, used in connection with a measured distance, stands on the rock.

Anchorage.—Bormes Road is exposed to southeast winds, and the holding ground is indifferent; the better anchorage is off the coast between Lavandou and Nervio Point, about 600 yards from the shore in 9 or 10 fathoms, sand and mud.

To the northeastward of Lavandou is a small bay with a beach about $\frac{1}{2}$ mile wide, where coasting vessels anchor with offshore winds in 8 or 9 fathoms, sand. An islet and some rocks lie off the southern point at about 400 yards from the shore.

Cape Négret.—The cape is high, black, projecting to the south, and steep on the east side; the coast to the westward is high, forming small bays with beaches. Layet Point, the next westward of Cape Négret, is foul, and in the bay westward of the point rocks extend nearly 400 yards from the shore. The cape is bold and clear of danger.

Coast.—From Cape Négret to Cape Cavalaire the coast forms the foot of a chain of steep hills, remarkable for the dark color given to them by the pines by which they are covered; they present a succession of points of red color, which can be approached at a distance of $\frac{1}{2}$ mile. The only dangers are a reef which extends 400 yards southward from Datier Point and Malpague Rock, $134^{\circ} 30'$ from a ruined tower of the same name, and 300 yards from the coast; it is steep-to. There is no anchorage along this part.

Cape Cavalaire is of a dark color, moderately high at its south part, and low to the northeast; on it is an old windmill tower and the ruins of a guard house. The cape is skirted with rocks, but they are near the land.

Cavalaire Bay—Anchorage.—To the northeastward of the cape is Cavalaire Bay with a narrow beach off which there is anchorage sheltered from westerly winds. There is anchorage along the whole length of the beach for nearly 2 miles, but that generally used is to the northeastward of the tower in about 8 fathoms, with Titan lighthouse open of the northeastern point of Cavalaire (the point with the old mill on it). A jetty 327 feet long, with a breadth of 31 feet, has been built in a 2° direction from the rocks awash under the town on Cape Cavalaire; there is a depth of $13\frac{1}{2}$ feet at its extremity. The beach at the anchorage is backed by a mass of elevated land, of a dark color, from its being planted with pine trees. Several small streams run into the bay, and the coast is skirted by rocks. At 2 miles 303° from the anchorage the mountains are 1,719 feet above the sea, and form part of a chain extending westward and sloping to the sea.

Life-saving station.—A rocket apparatus is stationed at Cavalaire customhouse, where there is also an establishment for affording aid to shipwrecked mariners.

Cape Lardier, the eastern extremity of Cavalaire Bay, is 276 feet high, rugged and white, projecting to the southward, and is skirted with rocks, one of which is remarkable from its size and shape. About 100 yards southward of the rock is a shoal with $\frac{1}{2}$ fathom water on it; and 300 yards 202° from the cape is a patch of $5\frac{1}{2}$ fathoms. A sunken rock of small extent, with a least depth of 19 feet, lies with Cape Lardier bearing 297° distant 1,200 yards.

Life-saving station.—There is a life-saving station at Cape Lardier.

Cape Taillat, 200 feet high, with a whitish base, is the extremity of a small steep rugged peninsula and close off it is a small islet. The peninsula is connected to the main by a sandy isthmus, and the shore between the two capes forms a bay, which is skirted here and there by rocks.

Rocks extend from 200 to 600 yards 33° from Cape Taillat.

Measured distances.—Distances for ascertaining the speed of steamers have been measured and marked, thus: The running marks are, on the west, the beacon on the west summit of Île Porquerolles in line with the white watch-house on Batterie des Mèdes, and, on the east, the beacon on the summit of Cape Taillat in range with the white wall on the southern fall of Cape Lardier, 64° and 244° . The western limit is La Tour du Château Roy in range with the beacon on a rock between Ile Brégançon and the land.

The eastern limit is the white wall, on the side of the mountain westward of Baie de Cavalaire, in line with the white wall on Cape Cavalaire.

The length of the distance is 21,498 yards.

The distance between the western limit and a line from Pointe du Nard Viou through the beacon on Rocher de la Fourmigue is 7,115 yards.

The distance between the western limit and a line from the beacon in a field on the north shore of Baie de Cavalière through the beacon on Cape Négret is 11,670 yards.

Cape Camarat slopes gently from a hill 360 feet high covered with vegetation, terminating in a low point of reddish color. The coast from Cape Taillat forms a bight, and nearly midway is the Escudelier Rock about 16 feet above the sea and almost joining the land. One-third mile eastward of the rock is the Cassin Shoal with 5 feet water on it. Close to the cape is Portes Rock, 39 feet high, and others extend off nearly $\frac{1}{2}$ mile, the outer (Fouras Rock) being 16 feet above water, Mount Paillas, elevated 1,083 feet, with an old tower on its summit, lies $3\frac{1}{4}$ miles 290° from the cape.

Currents.—The currents of the coast between Cape Camarat and Cape d'Antibes are very variable and appear to depend on the wind; they are generally weak, with a rate of less than 1 knot.

Anchorage.—There is anchorage with northwest winds, which are at times heavy squalls, between Cape Taillat and Escudelier Rock (named Bon-Poré), in 10 to 12 fathoms, sand and mud, and to the southwestward of the cape, off a sandy beach; the former is preferable. It is, however, necessary to be cautious, to prevent being surprised here with winds from seaward.

Water may be obtained near the customhouse.

Light.—A group flashing white light is exhibited, at 429 feet above the sea, from a white square lighthouse, situated on Cape Camarat. The light is visible 28 miles.

Semaphore.—The semaphore is situated 32 yards 134° from the lighthouse. (See Light List.)

Life-saving station.—There is a life-saving station at Camarat.

Pampelanne Bay.—From Cape Camarat the coast trends to the northward, curving slightly westward, and forming the bay of Pam-

pelanne, with a beach 2 miles in extent, off which there is anchorage with westerly winds. Near the southern end of the beach is Bonne Terrasse Point, 56 feet high, with a coastguard house on it; the northern end terminates near Pinet Point.

Anchorage.—The anchorage generally used is 1,000 or 1,200 yards to the northeastward of the former point, in 10 or 11 fathoms, fine sand with patches of weed, and good holding ground. It is preferable to the anchorage of Bon-porté, as in the event of winds from seaward there is more room to clear the land; vessels should always be ready to leave.

Water may be obtained from a little covered spring near the customhouse, but it is sometimes dry in summer.

Beacon.—A truncated cone-shaped beacon made of lathwork stands on Cape Taillat.

Cape St. Tropez.—At the northern end of Pampelanne Beach the coast rises in wooded hills of moderate elevation and terminates in cliffs as far as Capon Point, when it descends to a small sandy beach, and rises again at Cape St. Tropez, the eastern extremity of a peninsula forming the southern side of the Gulf of St. Tropez.

Basses de la Moutte—Beacon.—Close off the cape is a small low islet covered with vegetation named La Moutte, and 1,200 yards 53° from it is a beacon tower, 25 feet high, colored black, surmounted by a cylinder.

A rock with 2 fathoms on it has been found 180 yards 52° from this tower.

From la Moutte Islet shallow water extends nearly 1 mile 56° and is the principal danger on the southern side of the entrance to the Gulf of St. Tropez. The lighthouse on Cape Camarat, bearing westward 213° and about 6° open of the Teste de Can Rocks, leads eastward of this danger.

Teste de Can, a group of rocks nearly 1,400 yards southward of la Moutte Islet are nearly the same distance from the shore; there is no passage between them and the shore unless by those locally acquainted.

There are other off-lying rocky shoals in the vicinity of the Teste de Can on which the sea breaks with easterly gales. The outermost is le Verhugé, with 8 fathoms water on it, nearly 1½ miles 95° from the Teste de Can.

Nearly ¾ mile 241° of le Verhugé is another shoal of 5½ fathoms, and 303° of the latter is a patch of 4½ fathoms.

Clearing mark.—To avoid these shoals, keep Titan Lighthouse on Levant Island open of Cape Taillat and the Portes Rock at the foot of Cape Camarat until the mountain of St. Pierre is open northward of Rabiou Point.

Ay Rock, distant nearly $\frac{3}{4}$ mile 308° from La Moutte, and about 700 yards from the shore, is awash.

Rabiou Shoal, $\frac{1}{2}$ mile 326° from Ay Rock, and about 800 yards 33° from Rabiou Point, has 2 fathoms water on it. To avoid it keep la Moutte Islet open eastward of Ay Rock until the town of St. Tropez appears northward of the land on which the citadel stands.

Beacon.—A black stone tower, 38 feet high, surmounted by a cylinder, is erected on the shoal.

Caution.—Vessels rounding Cape St. Tropez with strong winds from the eastward should give it a berth of about 3 miles.

Gulf of St. Tropez.—This gulf is 4 miles deep in a westerly direction and somewhat more than 2 miles wide at its entrance, which is formed by Rabiou and Sardinières Points. The gulf is 1 mile wide at its head, and there the land is low and marshy, fronted by a sandy beach. The northern shore is backed by the lofty range of Mount St. Pierre, which slopes down to the town of St. Maxime; a river enters the sea at the foot of the range a short distance westward of the town.

At 900 yards westward of Rabiou Point is the battery and point of St. Pierre; thence the shore trends southward a long $\frac{1}{2}$ mile and forms the Bay of Canoubiés.

Port St. Tropez.—The small port of St. Tropez is about 44 yards wide at entrance and formed by two moles inclosing an area of about 250 by 200 yards, with 12 to 16 feet water. The North Mole is 350 yards long, with from 15 to 19 feet of water near its head; the West Mole is low and covered with a building yard. The port will not receive vessels of more than 13 feet draft of water.

The town, which occupies the site of ancient Heraclea, faces the head of the gulf and contains a population of about 3,500, who are chiefly engaged in tunny and other fisheries. In addition to the citadel the port is defended by two large towers, one at the north end of the town, the other on the West Mole. In steering for this port or the anchorage of Moulins, give the shore of the citadel and north part of the town a berth of about 300 yards.

Lights.—A fixed red light is exhibited, at an elevation of 51 feet above the sea, from a white masonry tower 49 feet in height on the extremity of the North Mole of St. Tropez. The light is visible 6 miles.

A fixed green light is exhibited from an iron standard at the extremity of the wharf that has been constructed at the entrance of the port of St. Tropez. It is elevated 22 feet above high water and 21 feet above the wharf, visible 2 miles. (See Light List.)

Buoys.—There are two red mooring buoys in the entrance to the port.

Supplies.—All necessary supplies can be procured at St. Tropez.

Communication.—There is a branch line to Cogolin which connects at La Fous with Toulon, Hyères, and St. Raphael Railroad.

Coal.—About 200 tons of coal are kept in stock for local consumption.

Life-saving station.—There is a life-saving station in Canoubiés Bay.

Port St. Maxime.—The small port of St. Maxime, on the northern side of the gulf, admits vessels of about 9 feet draft. It is protected from the southeast by a small mole, and, being better sheltered from the northwest than St. Tropez, is more frequented by coasting vessels, as they are able to weather Cape St. Tropez when bound to Toulon or Marseille with northeast or easterly winds. There are some mills near St. Maxime and a semaphore on a hill over it. Rocks and shoal water extend nearly $\frac{1}{2}$ mile 100° from the eastern point of the entrance to St. Maxime.

Light.—A fixed green light is exhibited from a support on a circular white tower, 35 feet above the sea, on the extremity of the jetty at Port St. Maxime. The light is visible 5 miles. (See Light List.)

Pilots.—There are no regular pilots, but the fishermen in the gulf are ready to offer their services.

Anchorage.—In Canoubiés Bay there is anchorage in from 4 to 7 fathoms, mud and weeds, 400 or 600 yards to the northeastward of the customhouse; in the rest of the bay the mud is so soft that anchors are likely to drag with strong winds. At the entrance of the bay there is a rocky shoal with $3\frac{1}{4}$ fathoms water on it; to avoid it keep about 400 yards from the western shore of the bay, above which are four old windmill towers. A madrague (tunny nets) is moored off the bay.

The anchorage of Moulins, about $\frac{1}{2}$ mile westward of the port of St. Tropez, is in from 8 to 9 fathoms, soft mud.

At the head of the gulf in the southern corner, and about $1\frac{1}{4}$ miles from St. Tropez, there is anchorage in from 6 to 7 fathoms somewhat protected from easterly winds by Bertaud Point and the shallow water off it; the remains of two old mills are on the point, and about 200 yards to the southwest is a building called the château Bertaud.

Sardinières Point, the northern point of entrance to the Gulf of St. Tropez, is surrounded with rocky shoals which extend eastward 1,300 yards, having no passage between them and the coast. The outermost rocks, named Les Sardineaux, and sèche à l'Huile, are above water, about 700 yards apart, northeastward and southwestward of each other; most of the others are covered.

Beacons.—A red masonry tower, surmounted by a cone, 36 feet high, stands on Sèche à l'Huile, and a red masonry tower, surmounted by a cone, 26 feet high, stands on Les Sardinaux; the former beacon

affords shelter for four people. There is deep water close southward of Sèche à l'Huile Beacon, but shoal water extends 300 yards north-eastward of Les Sardinaux Beacon.

Signal station.—A semaphore, a white house and tower, 36 feet high, and 441 feet above high water, stands on a hill about 1 mile westward of Pointe des Sardinaux.

Currents.—The current sets out of the gulf after easterly winds, and into it after northwesterly winds, at a rate rarely above 1 knot.

Gulf of Fréjus.—From Sardinières Point the coast trends to the northward and eastward to Alexandre (Issambres) Point, which is low and skirted with rocks; there is a coast-guard house on it, and the land over the point is high; the coast then takes a north-north-east direction to the point, battery, and customhouse of St. Ego, which forms the western extremity of the Gulf of Fréjus. From it a low, sandy beach with the outlet of the small river Argens continues in the same direction to the head of the gulf, and near the town of St. Raphael, whence the coast, which is high, trends south-southeast to Lion Point, the eastern extremity of the gulf. One mile inland from the head of the gulf is the town of Fréjus, and on the western side of it is Mount Roquebrune, which is steep on the western side, with a flat summit; while to the eastward is Mount Esterelle (which forms three peaks); and Capes Drammond and Roux. The town of Fréjus (ancient Forum Juilii) has a cathedral and palace, and a population of 3,135.

Life-saving station.—There is a life-saving station on Alexandre Point.

Landmarks.—A large church near the pier of St. Raphael and the following objects are conspicuous when approaching Fréjus Gulf. The Villa Mimosas, a large white house $\frac{1}{2}$ mile to the southeastward of the pier; a house situated on the left bank of the Argens River, about $\frac{1}{4}$ mile from the shore, and the college of the Maristes at Balaury Point, $1\frac{1}{2}$ miles eastward of Lion Point.

Port St. Raphael, at the head of the Gulf of Fréjus, is formed by two moles, one of which is 236 yards long and the other 14.

At 200 yards 213° from the extremity of the Outer Mole is a rock with only 9 feet of water over it.

There is a depth of 13 feet in the port, and along the inside of the outer part of the outer mole is a trench 22 yards wide, with 18 feet water. Fresh northwesterly winds cause a choppy sea in the port, and southerly and southwesterly winds much surf.

Trade.—The trade of St. Raphael is very small, the principal exports being bauxite; other articles of export are iron ore, timber, and cork waste. Small quantities of cork and coal are imported.

Buoys.—Two white buoys have been moored in the Rade de St. Raphael northward of Lion de Mer and south-southwestward

of the port. Two black buoys are moored in the Rade de St. Raphael, southward of St. Raphael Light, for the use of the Naval Aviation Service.

Light.—A group occulting white light, elevated 30 feet above the sea, and visible 10 miles, is exhibited from a white iron cylindrical tower, 26 feet in height, on the end of the outer mole at St. Raphael. In southerly gales it may be impossible to exhibit this light. (See Light List.)

St. Raphael town is a winter resort and bathing place, with a population of about 4,250. The new church, with a large dome, is very conspicuous from seaward. Here the railroad lines from Marseilles, Hyères, etc., to Ventimiglia, and from Hyères to St. Raphael meet, and the former line continues eastward along the coast.

Anchorage.—The road of St. Raphael is the only anchorage in this gulf, and though exposed to the southward the holding ground is good. Merchant vessels anchor in 7 or 9 fathoms water, 300 yards from the pier of St. Raphael, and naval vessels in from 10 to 12 fathoms, with the square steeple of St. Raphael in range with the light at the end of the jetty, or an old mill near the chapel of St. Raphael and the church of St. Sebastian, 207 feet high, in line. The town is $\frac{1}{4}$ mile southeastward of the river at the head of the gulf, and between it and Fréjus is an old light tower.

The railroad from Nice, passing through St. Raphael to Toulon, here leaves the coast and runs in a northwest direction.

Supplies.—Provisions can be obtained at Fréjus and at St. Raphael. Water can be taken at all seasons from Rivière d'Argens and Ruisseau de la Garonne, which flows into the sea immediately westward of the north mole, but the town and port are now supplied directly by Canal de la Siagnole; there is a water pipe on the end of the outer mole.

Life-saving station.—A rocket apparatus is stationed at St. Raphael customhouse.

The shore from Port de St. Raphael trends southeastward a little more than one mile to Pointe des Lions; it is bordered by rocks, and the 5-fathom curve is about 250 yards off it.

Lion Point, the eastern extremity of the Gulf of Fréjus, is the termination of high land. To the westward of the point are two large islets or rocks; one close to surrounded by sunken rocks, the other (the Lion, 39 feet high) is nearly $\frac{1}{2}$ mile from the coast, and between them there is a depth of 18 fathoms.

Cape Drammond projects to the southward, is 482 feet high, and has a semaphore signal tower on it. At its foot are several rocks, and on the west is Ile d'Or with reefs extending 400 yards from it to the southwestward. The coast between it and Lion Point is high and skirted with rocks.

Agay Road, on the eastern side of Cape Drammond, is a narrow bay 1 mile deep, the head of which is a sandy beach. Beaumette Point on the eastern side of the entrance is low, and surrounded with rocks, the ledge extending 200 yards off. On the eastern side of the bay is a castle, and on the western side a coast-guard station and an obelisk, and a little beyond a railroad bridge, the station being between it and a second railroad bridge of three arches which crosses the small river Agay. Vessels anchor during northwest winds southward of the castle in 9 or 10 fathoms, mud and weeds, good holding ground; but small vessels go nearer the beach in 3 or 4 fathoms.

A pile pier 147 feet long and 14 feet wide has been constructed on the northern shore of the road; there is a depth of 9 feet at its extremity.

Water.—The mouth of the Agay River is dry except during rains; water can always be obtained from a well near the castle on the east side.

Light.—An occulting red and white light is exhibited, at an elevation of 92 feet above high water, from a square tower on main building situated on Beaumette Point. It shows white seaward through an arc of 98° between the bearings of 294° and 32° (the second bearing leads about 100 yards seaward of the dangers off Cape Drammond and the first leads 450 yards southward of the tower of Agay Shoal); and red northward of the first bearing toward the shore. The light is obscured elsewhere. The red light is visible 6 miles, and the white light 11 miles. (For sectors see Light list and chart.)

Life-saving station.—There is a gun life-saving apparatus at Agay.

Agay Shoal.—At 1 mile eastward of Beaumette Point, and near the coast, is the small islet of Boute with a flat surface, surrounded by rocks. At 200 yards southward of the islet is a rock resembling a cask, and 300 yards farther out is Agay Shoal, with less than 1 fathom water, on which is a red beacon tower, 25 feet high, surmounted by a cone (*la Chrétienne*). Between the islet and the rock there are $3\frac{1}{2}$ fathoms water, and between the rock and Agay Shoal 6 fathoms.

The coast.—From Agay Road the coast, which is high and rugged, and skirted at a short distance with rocks, trends to the northeastward to Cape Roux, and from thence northward to Cape Aiguillon a distance of 5 miles. Cape Roux is the termination of a mountain, which rises less than 1 mile to the northwestward of it, and which commands all the surrounding land. The mountain is irregular in outline, steep, and its reddish cliffs, from which the cape derives its name, form a contrast to the dark forests of pine around it; there is a small tower on its summit 1,486 feet above the sea. It

is a good mark for this part of the coast, as is also Cape Drammond, and the red cliffs of mornes rouges d'Agay, over the head of Agay Road. The cape has a coast-guard house on it and rocks extend from it about 200 yards to the southeastward.

Cape Aiguillon is 333 feet high and steep, with a rock above water named Vaquette, lying 600 yards to the southeastward of it. The coast between this latter cape and Espinasse Point, $\frac{3}{4}$ mile to the northward is formed of steep red cliffs 820 feet high and thence descends rapidly to Aiguille Point, which terminates in a pyramidal rock, the western extremity of the Gulf of Napoule. Rocks extend about 400 yards off, on the eastern side of the latter point.

Anchorage.—There is anchorage in 4 to 6 fathoms sheltered from northwest winds in Figuerette Bay at about 200 yards from the shore and 600 yards to the westward of the southern point of Cape Aiguillon; from the anchorage Garoupe light and the semaphore at Ste. Marguerite would be masked by Cape Aiguillon.

The Gulf of Napoule is 3 miles wide at the entrance and $2\frac{1}{2}$ miles deep, but being open to the southward and having deep water throughout, is seldom frequented. There is an anchorage just within the entrance on the western side, near the village of Théoulé, between Aiguille Point and Rague viaduct, affording shelter from westerly winds, in from 8 to 9 fathoms, sand and mud; also farther northward off the village of Napoule. Both anchorages are near the shore. The 100-fathom curve of soundings is only 700 yards off the beach at the head of this gulf.

Life-saving station.—There is a life-saving station at the village of Théoulé.

Water can be procured in the bay a little within the southern point of the gulf.

Cannes.—From Napoule a sandy beach curves round to the northward and eastward for $3\frac{1}{2}$ miles to the town of Cannes. The port of Cannes, which will receive vessels of 18 feet draft, is protected from the southwestward by Jetée Ouest, a mole, extending about 350 feet to the southeastward. Jetée Albert Edouard extends 500 yards southward and southwestward on the eastern side of the port, leaving an entrance between its extremity and the inner angle of Jetée Ouest, about 200 yards wide. The port, which is also sheltered by the islands of St. Marguerite and St. Honorat, has been dredged to a depth of 20 feet in places; the bottom is sand and mud in the center; in all the other parts bordering the shore to the north and as far as Croisette Point the bottom is studded with rocks. There is a depth of about 18 feet alongside the inner part of Jetée Ouest and along the southern part of Quai St. Pierre, the western quay, but the northern part of the port is shoal and strewn with rocks. There are mooring rings along the quays and Jetée Albert Edouard,

to which vessels haul their sterns after anchoring. A jetty, 130 feet long, extends from near the entrance to the Boulevard de la Croisette for the use of yachts.

Works are in progress for raising and improving the west breakwater, which, when completed, will have a length of about 1,140 feet. There are sunken rocks in the middle of the northern part of the harbor. The west breakwater is named *Jetée Ouest* and that forming the eastern side of the port, *Jetée Albert Edouard*.

The old town stands on the shore, on the margin of the harbor, and at the foot of the hill, on the summit of which are two large square towers, the lowest being that of the cathedral. The principal street is that which forms the high road from Fréjus to Antibes. From either side of the old town, along the shore and up the hills in its vicinity, have spread numerous houses and villas; the population is about 29,659.

The Boulevard Jean Hibert (formerly Boulevard du Midi) on the west side of Cannes, along the sea front, has been completed to La Napoule, a distance of $4\frac{1}{2}$ miles from the port of Cannes, thus connecting it with the Corniche road to St. Raphael. Cannes has now a supply of excellent water, brought in pipes from a distance of 25 miles north of the town, at an altitude of 2,460 feet. The discharge is 154 gallons per second.

From the healthfulness of the climate Cannes is much resorted to by invalids, especially during the winter. The town is connected by rail with Marseille and Monaco, and there is weekly communication by steamer to Marseille, Nice and Genoa. Cannes is the seaport of Grasse, a town celebrated for its manufactories of perfumery and liquors. The climate is said to be mild and uniform, the average temperature in winter is 51° . East and southeast winds prevail. Annual rainfall, 35 inches.

Trade.—The chief imports are cereals, coal, timber, coke, charcoal, pottery, and glass; the exports are very small, mostly old iron, coal, and fireproof earthenware. The local industries in the neighborhood are principally the hotels and the cultivation of flowers.

Coal, supplies, and repairs.—Coal can be obtained; about 25,000 tons are imported annually, and about 7,000 tons are kept in stock during winter and 1,000 to 2,000 tons in summer. The coal is carted to Albert-Edouard Jetty, where there is a depth of 16 feet alongside for a length of 300 feet at extremity, and put on board in baskets at the rate of 100 to 200 tons a day. Supplies are plentiful; water can be had at the quay, free. None but the slightest repairs can be executed.

Light.—The white circular turret on the molehead at Cannes is 34 feet in height.

Sécant de Cannes (Le Sécant) Shoal—Light.—A fixed green light is exhibited, at an elevation of 26 feet, from a truncated conical

beacon of masonry, painted red, erected on this shoal. The light is visible 3 miles, and, being unwatched, should not be relied on.

Jetée Ouest—Light.—A fixed red light, elevated 19 feet above the sea, and visible 4 miles, is exhibited from a black iron column, on the outer end of the Jetée Ouest. Provisional and unwatched.

Light.—A fixed white light, visible 11 miles, is exhibited at an elevation of 49 feet above the sea from a white circular turret situated on the molehead at Cannes.

Life-saving station.—There is a rocket life-saving apparatus at Cannes customhouse.

Cannes Road is between the line of the two towers on the west, and the cathedral tower in range with the lighthouse on the east; the best berth is in from $7\frac{1}{2}$ to 9 fathoms, sand and mud, about 400 yards southward of the mole, or, if necessary, farther out, taking care to avoid some rocky heads, one of which, the Roche de la Rade (la Lière), of $4\frac{1}{2}$ fathoms, lies about 168° 800 yards from the lighthouse.

At 700 yards westward of Fouillée Shoal the bottom has been found to be uneven and rocky, the depths varying from 10 to 20 fathoms within a vessel's length.

Directions.—When entering the port, the shoals of Fouillée and Sécant de Cannes should be avoided; the former lies $\frac{1}{2}$ mile 263° from the lighthouse on the mole and 800 yards from the shore, with a depth of 21 feet on the southern head and 24 feet on the northern; it is 267 yards in extent north-northwestward and south-southeastward. Vessels anchor and haul their sterns to the mole or quay.

The high tower over the old town open to the eastward of the cathedral tower or the lighthouse bearing 44° leads in eastward of the Fouillée. To avoid the Sécant de Cannes, keep a short 100 yards from the molehead.

Landing.—The pier at Larouchefoucauld is partly destroyed, but can be distinguished. There is a stone bridge over the railroad at this point.

Croisette Point is low, projects southward, and forms the eastern extremity of the Gulf of Napoule and the western extremity of the Gulf of Jouan. On the Croisette are fine orange groves and many houses. A small tower in ruins stands on the point, and shallow rocky ground connects it with the Lerins Islands, lying from $\frac{3}{4}$ to $1\frac{1}{2}$ miles southward of the point.

Lerins Islands consist of two large islands, low, but well wooded, and several islets, taking the name Lerins from their ancient names Lerinus and Lero, situated from about 1,400 yards to nearly 2 miles south-southeastward of Pointe Croisette.

Ste. Marguerite, the largest island, is $1\frac{1}{2}$ miles in length, east and westward, and its greatest breadth is about $\frac{1}{2}$ mile; on its northern point is the citadel. The island is skirted by rocks and shoal

water in all directions, except just in the neighborhood of the citadel, where there is anchorage. Foul ground, on which is situated Tradière Islet, extends nearly 600 yards from the eastern extremity of Ste. Marguerite. From Point Batiguiet, rocks and shoals extend 500 yards toward the Jonquièrre Shoals; that part known as the Batiguiet Shoal being marked by a stone beacon 10 feet high, painted in red and white horizontal stripes, surmounted by two reversed cones. Shoal water (8 feet in midchannel) connects the island to Croisette Point.

Telegraph.—A submarine telegraph cable connects Pointe Croisette with a position about 150 yards eastward of the citadel on this island; the landing places at each end are indicated by pairs of beacons, painted blue and white in horizontal bands, having circular white topmarks.

The Vengeur Shoal, with $3\frac{1}{4}$ fathoms on its extremity and shoaling toward the shore, extends 400 yards from the coast at 750 yards westward of the eastern point of the island.

St. Honorat, the smaller island, is about $\frac{3}{4}$ mile in length, and lies parallel to Ste. Marguerite, the channel between being about $\frac{1}{2}$ mile wide. On the southern side of the island is an abbey, and a chapel on the eastern end (St. Féréol Point), both in ruins; the island is low and cultivated, and there are trees scattered along the shore. Foul ground extends 600 yards from St. Féréol Point.

Les Moines (Monks).—Islets, rocks, and foul ground extend 1,200 yards from the southern shore.

Beacon.—A beacon tower, 20 feet high, painted in black and white horizontal stripes and surmounted by a diamond, is erected 330 yards inside the outer dangers. Vessels should pass more than 600 yards outside the beacon.

Life-saving station.—There is a mortar life-saving apparatus at St. Honorat.

The Channel of Ste. Marguerite between that island and Croisette Point is 1,400 yards wide, and convenient under favorable circumstances for vessels under 8 feet draft. It is bounded on the north by the shoals around Croisette Point, and on the south by the Jonquièrre Shoals, which extend 500 yards 354° from the northwestern extremity of Ste. Marguerite; Passage Rocks lie to the north-northwestward of the citadel on the island and nearly midway between it and Croisette Point.

A small vessel taking this channel from the westward, when a long $\frac{1}{2}$ mile from Croisette Point, should bring a sentry box (between two chimneys in the citadel) bearing about 129° , which will lead to the anchorage under Ste. Marguerite citadel where there is shelter from southerly winds. Large vessels anchor to the north and northeastward of the citadel in from 7 to 12 fathoms, sand, weed, and mud.

Vengeur Point a little open northward of Citadel Point, bearing 112° , leads northward of Jonquièrè Shoal.

The Channel of St. Honorat can be used by vessels of under 8 feet draft, by passing about 200 yards from the southern side of Ste. Marguerite Island, and northward of the Middle Flat, a rocky shoal of 5 feet in the middle of the channel. The Château Napoule slightly open northward of Mount Barbossi leads through, but on this mark a vessel will pass only 97 yards to the southward of a shoal with 8 feet of water over it. The French Government vessel *Hyène*, drawing 9 feet water, is reported to have touched the ground, with these marks in range. This channel is used by vessels when unable to round the reefs of Les Moines (Monks).

The Gulf of Juan is formed between Croisette Point and Cape d'Antibes or Garoupe. It is about 2 miles deep with a low coast and sandy beaches, off which scattered sunken rocks extend for nearly $\frac{1}{2}$ mile. In the center of the gulf is Fourmigue Rock, 8 feet high (with red masonry tower, surmounted by a cone 47 feet high) inside which the water shoals gradually, but off the western shore the water is deep.

The beacon is about 140 yards southward of the northern rock of the group, and the same distance northward of the southern rock, which has 2 feet water.

Fourmigue Shoals, nearly 1 mile in extent east and west, with deep-water passages between, lie across the entrance of the gulf. Fourmigue Rock at the western end and marked by a red beacon tower 38 feet above the sea, with conical top-mark, is nearly $1\frac{1}{2}$ miles 264° from l'Îlette Lighthouse (Cape d'Antibes), it has several patches extending 200 yards north and south from it.

Sécánion Shoal, at the eastern end of which are $2\frac{1}{2}$ fathoms, is 1,600 yards 264° from the lighthouse, with depths from 12 to 27 fathoms in the channel between.

Fourmigue and Sécánion Shoals are covered by a sector of red light from Cap d'Antibes Lighthouse.

Buoy.—A spindle buoy, painted black and surmounted by cylindrical top-mark, is moored off the northern side of Sécánion Shoal; a patch of $4\frac{1}{2}$ fathoms lies about 100 yards northward of the buoy.

A rock with $3\frac{1}{2}$ fathoms over it, about 55 yards long, northeast and southwest direction, by 10 yards wide, lies 200 yards 101° from the beacon on Fourmigue Rock, and at 800 yards eastward of the beacon is a shoal of $3\frac{1}{2}$ fathoms; and another rock, with a depth of 4 fathoms on it, is situated in a position with the beacon bearing 290° , distant 400 yards.

Vessels of deep draft should not use the channel eastward of Fourmigue Rock.

A shoal of $4\frac{1}{2}$ fathoms lies 1,700 yards 123° from Golfe Juan Lighthouse.

Seche de la Verne, a rocky patch with 1 fathom of water over it, lies 600 yards off the shore in the northeastern part of the Gulf of Jouan.

Port de Golfe Juan.—On the shore in the northwestern part of the gulf is the village and railroad station of Golfe Juan, the latter not easily seen for the number of houses and sheds built around it; at $1\frac{1}{4}$ miles 312° is the town of Vallauris, celebrated for its pottery manufactories, and containing a population of about 3,000.

Piers.—There are two landing piers, constructed of wood, and close together.

Supplies.—Good water can be procured near the eastern end of the village. Water is laid on to the south mole and also to the quay on the northwest shore of the port. Fresh meat, vegetables, and bread are to be obtained.

Life-saving station.—There is a rocket life-saving apparatus at Golfe Juan.

Jetties.—At Golfe Juan Village the South Jetty extends in a 142° direction for 200 yards from the shore and thence 90° for a distance of 300 yards. The North Jetty, situated about $\frac{1}{4}$ mile eastward of the South Jetty, extends a little over 200 yards from the shore in a 173° direction; the harbor inside of them has depths of from 3 to 12 feet.

Lights.—An occulting light with red, white, and green sectors is exhibited, at an elevation of 55 feet above the sea, from a white masonry tower 50 feet high, situated on the beach 600 yards 277° from the South Jetty Head. The light is visible 13 miles for all colors. (For limits of sectors see Light List and chart.)

By keeping in either of the white sectors of light vessels will pass at about 200 yards clear of the dangers bordering the sides of East and West Passages leading into Gulf of Juan.

A fixed red light, unwatched, is exhibited at an elevation of 30 feet above the sea, visible 5 miles, from an iron column 19 feet high on the outer end of the South Jetty, Golfe Juan Village.

Tide.—With southerly winds a rise of 1 foot has been observed, and at the Fourmigue beacon the set was generally to the westward; the reef uncovers about 10 yards to the northward of the beacon at low water.

Anchorage.—The anchorage in the gulf is roomy, and extends between Golfe Juan Village and Fourmigue Shoals, and also eastward of this line, in from 6 to 10 fathoms, mud and weeds, good holding ground. It is somewhat sheltered from the southward by the Fourmigue Shoals. There are two passages into the gulf, one between la Fourmigue Rock and Ste. Marguerite, the other between

Cape d'Antibes and the buoy on Sécanion Shoal. The western passage is best, the only danger being Vengeur Shoal, which extends off the point of the same name on Ste. Marguerite Island. The eastern passage is not so wide, but by giving the shore of Cape d'Antibes a berth of 800 yards a vessel will pass about midway between it and the dangers on the west. The Gulf of Juan is the favorite anchorage of the French Fleet.

The anchorage of Piton, on the eastern side of the gulf, is frequented by vessels during easterly winds, but southerly winds send in a heavy sea. Northwest winds blow very violently at times out of the gulf, and last from 2 to 8 or 9, and even 18 days.

Cape d'Antibes or Garoupe is low, projects southward, and is surrounded to the distance of 200 yards by rocks, some of which are covered; it rises gradually to a wooded hill 249 feet high. The coast eastward thence becomes irregular and higher, and at $1\frac{1}{4}$ miles to the northeast is Cape Gros.

Life-saving station.—There is a gun life-saving apparatus at Cape d'Antibes.

St. Pierre Shoal, nearly 400 yards southward of Cape d'Antibes, is a rocky shoal of $2\frac{3}{4}$ fathoms water.

Light.—A fixed light with white, red, and green sectors, elevated 48 feet above the sea, is exhibited from a white circular tower, 31 feet in height, situated about 200 yards 334° from Pointe del'lette, the extremity of Cape d'Antibes. The white, red, and green lights are visible 12, 8, and 5 miles, respectively. (For sectors, see Light List and chart.)

Garoupe Light.—At 1 mile to the northward of Cape Gros is a hill higher than the land around it, and on which is the chapel of Notre Dame d'Antibes, with a square tower. Near the chapel is a white circular tower 79 feet high, which exhibits, at 338 feet above the sea, a group-flashing white light, visible 24 miles. (See Light List.)

Semaphore.—There is a semaphore station near the lighthouse.

Bacon Point.—The hill on which the chapel and lighthouse stand slopes to the northeastward about $\frac{1}{2}$ mile to Bacon Point, on which is a redoubt. About $\frac{3}{4}$ mile northward of the point is the town of Antibes, the intermediate shore forming a bay where, with westerly winds, there is anchorage in any convenient depths, sand and mud, but northerly and easterly winds blow directly in.

Grenille Shoals.—Two hundred yards northeastward of Bacon Point is La Grenille Rock, not very high, and a reef on which is only $1\frac{1}{2}$ fathoms water extends 200 yards beyond it. At 600 yards 87° from La Grenille is La Péquerolle, a shoal with 7 fathoms on it and deep water close around. Another rock, the Petite Grenille, lies in the bay 800 yards westward of La Grenille; and shoal water also

extends from this rock nearly 200 yards to the northeastward. To pass outside the shoals off Bacon Point, keep Carré Fort open to the northward of the battery on the East Mole at Antibes.

Antibes (the ancient Antipolis) is strongly fortified, especially on the land side. It contains a population of about 6,650, who are principally employed in fishing and curing sardines and anchovies. Antibes exports chiefly grain, flour, and oilcake, and the railroad passes close to the town. To the northward of the town is the promontory and fort of Carré, the shore between forming a shallow bay.

The port is formed by two moles; the east one is high, constructed upon a bed of rocks, and extends about 350 yards from the town and to within the same distance from the shore of Fort Carré. The rocks from the central part of the mole project seaward, and on them is a battery. Within the above and nearly parallel to it is the West Mole, about 200 yards from it, inclosing a space about 200 yards wide, with an average depth of 16 feet. The entrance is 240 feet wide. The port can not receive vessels exceeding 15 feet draft of water.

Coal.—There is a stock of from 30 to 300 tons of coal in the town; it varies according to the season.

Repairs can be effected at the building yards, where yachts and motor boats are constructed.

Supplies can be obtained in moderate quantities. There are three water pipes on the southern quay of the port.

Life-saving station.—There is a gun life-saving apparatus at Antibes.

Seche des Cinq-Cents-Francis is a shoal extending about 300 yards eastward from the lighthouse; it has $1\frac{1}{2}$ fathoms water on its extremity and is marked by a black buoy, which is liable to be washed away with staff and cylinder.

Lights.—A group occulting light, with white and red sectors, elevated 49 feet above the sea, is exhibited from a circular tower, 33 feet high, on the extremity of the East Mole at the entrance to the port of Antibes. The white light is visible 14, and the red light 9, miles. (For sectors, see Light List and chart.)

A small fixed red light, which is extinguished at 2 a. m., is shown from the extremity of the West Mole.

Buoys.—Three white mooring buoys are anchored along the coast and about 100 yards from the rocks southeastward of Fort Carré.

Telegraph.—A submarine cable is landed in the cove northward of Fort Carré.

The position is marked by two beacons, painted blue and white in horizontal bands, surmounted by white circular topmarks.

These beacons, when in range bearing 270° , lead close eastward of the line of cable.

Radio.—A radio station, open at all times, is established at Cros de Cagnes, near Nice, in latitude $43^{\circ} 39' N.$, longitude $7^{\circ} 10' E.$ Call letters F F G.

Directions.—When entering the port of Antibes, steer in for Fort Carré, and bring the cemetery, which is on the northwestern side of the town, open northward of the lighthouse, so as to avoid the Sèche des Cinq-Cents-Francis.

To pass 200 yards eastward of it, keep Cape Gros and Bacon Point in line. Having passed this shoal the lighthouse should be rounded close-to, so as to avoid the shallow ground extending from the western shore of the bay, on the extremity of which is a small mass of concrete surmounted by a vane; the passage in is very narrow. Vessels anchor in the middle of the port and moor alongside the mole with their sterns toward the town.

When unable to enter the port in consequence of strong offshore winds, there is anchorage in the bay southward of the town in any convenient depth, good holding ground.

Var River.—Nearly $5\frac{1}{2}$ miles 39° from Fort Carré is the mouth of the Var River; the intermediate coast forms a bay, with a low beach of sand and gravel, steep-to and clear of danger; within $1\frac{1}{2}$ miles of the shore are the villages of Biot, Villeneuve, Cagnes, and St. Laurent; at the latter (on the west bank of the river) the Var is crossed by two bridges, the northern of which is old and built of wood; the southern is of modern construction and over it the railroad passes to Nice. The Var rises in the department of the Basses-Alps and takes a general southeasterly direction for 78 miles; it is liable to heavy freshets in the spring, but in summer it is but an insignificant stream. The sands at the mouth of the Var extend southward more than $\frac{1}{2}$ mile, and about the same distance outside them the depth is upward of 100 fathoms. The alluvial matter brought down by the river discolors the sea for some distance out.

Current.—The currents on the coast are variable and in the direction with the wind; at Capes Garoupe and Ferrat they run to the northeast with southwest winds and to the west with easterly winds; they are scarcely felt at more than $\frac{1}{2}$ mile from the coast. To the westward of Nice and off the River Var they generally run to the west; to the eastward of Nice they are little felt in the bays, but are sometimes strong at Capes Aggio and Martin.

Nice.—The port of Nice, situated about 4 miles eastward of the mouth of the River Var, is formed by an outer mole, projecting from the shore on the eastern side of Mount Chateau in a south-east direction; and by an inner mole from the opposite shore. They inclose an artificial harbor consisting of two basins and an outer port. The Premier Basin is 436 feet long, 636 feet average width, 207 feet wide at entrance, and depth on sill 22 feet. The

Deuxième Basin, connected with the former, is 623 feet long, 440 feet average width, 125 feet wide at entrance, with 21 feet over sill; within there is a uniform depth of 21 feet. The quays are very broad and handsome, and are some 7 or 8 feet above the water level; several little streams of fresh water flow into the basin. Owing to the shelving nature of the quays in the old portion, vessels can not be berthed close up, but are compelled to use long gangways. Several steamers have reported having bumped when at their berths. Vessels drawing more than 19 feet have to lighten their cargoes before being allowed to enter.

A small mole projects to the southwestward from the eastern shore abreast the Outer Mole Head. Warping buoys are laid at the entrance. There is a small stone beacon 12 feet high, painted red and surmounted by a cone, on the southern edge of a ledge of rocks 200 yards eastward of the end of the Outer Mole, off the small mole above mentioned.

A great extension of the outer port is in progress, and a surface of about 5 acres is being leveled for the storage of merchandise.

In the inner harbor there are 4,089 feet of quayage, of which a length of 1,870 feet has 21 feet alongside.

In the outer harbor there are 704 feet of quayage on the new eastern quay, and 328 feet on Môle Vieux, with 24 feet water alongside.

There are six cranes, one fixed of 10 tons, one fixed of 30 tons, and four traveling of 3 tons.

There is a battery on the shore at the inner end of the Outer Mole.

Vessels entering this close port are recommended to obtain local assistance.

The position of Nice will be known by Mont Nagel, or Agel, called also the Table of Monaco, which is about 6 miles to the northeastward of Villefranche; and by the Aiguille de Menton, which has a sugar-loaf peak, a little farther to the eastward. These two mountains may be seen in clear weather from a distance of from 45 to 60 miles. On a nearer approach the lighthouse on Malalongue Point, and Fort Montalban on the height which separates Nice from Villefranche, will be seen. There is a remarkable cliff or piece of ground of a whitish red color in a ravine about half way up a mountain, a short distance eastward of Villefranche, which is also a good mark.

Buoy.—A white warping buoy is moored northeastward of the lighthouse on Outer Mole.

Depths.—The port will receive vessels of 20 feet draft. Port Extérieur is dredged to a depth of 23 feet, and Port Intérieur to a depth of 21 feet within about 40 feet from the quays.

Lights.—A fixed white light varied by a red flash, visible 11 miles, is exhibited at 74 feet above the sea from a white stone tower

situated on the extremity of the Outer Mole at Nice. From the extremity of the extension of the Outer Mole is exhibited a provisional fixed red light, elevated 39 feet, and visible 4 miles.

A fixed red light is shown from a pillar situated 66 yards from the root of Outer Mole, and a fixed green light, visible 2 miles, is shown from a pillar at the root of the mole.

At the extremity of the Inner Mole a fixed red light is exhibited.

A fixed green light is exhibited from the east side of the entrance to the North Basin. (See Light List.)

The lights at the extremity of Inner Mole and on the eastern side of entrance to North Basin are shown from pillars.

Pilots board all vessels off the entrance to the port. Pilotage is voluntary.

Life-saving station.—There is a rocket life-saving apparatus at Nice customhouse.

Directions.—From the southwestward approach with Fort Mont Alban bearing 35° , and from the eastward give a berth of about 200 yards to Cape Nice. Pass close eastward of the outer end of the Outer Mole, and steer northwestward along that mole into the port.

Vessels entering the port are advised to obtain local assistance.

Naval vessels and yachts generally moor head to the southward, with stern hauled in to Quai Nord of Port Intérieur; steam merchant vessels are secured alongside the quays. Vessels are often inconvenienced at the entrance by a current caused by fresh water flowing out of the port; southwesterly winds cause a surf in the port when it is prudent to double the moorings.

Port Nice is not a port of refuge, and no attempt to obtain shelter there should be made with strong winds from between southwest and southeast, when Rade de Villefranche is available. When it rains in winter with southwesterly winds violent squalls render entrance dangerous.

Nice Approach—Fairway reserved for traffic when submarine vessels are exercising.—When the flag with a yellow and a red horizontal stripe is hoisted at the signal stations or on the vessels escorting submarine vessels to indicate that the latter are exercising submerged, all vessels entering or leaving the port of Nice must use the fairway defined below, in which submarine vessels do not exercise submerged.

The fairway is limited as follows:

On the west, by the alignment of Mont Gros Observatory and the Outer Mole Lighthouse.

On the east, by the alignment of Mont Gros Observatory and the cliffs on the eastern side of the entrance to the port.

On the south, by the parallel of Cape Ferrat.

The city of Nice is beautifully situated in a small plain at the foot of the Maritime Alps, by which it is protected from the north and east winds. It is encircled by bastioned walls, and has on the east Mount Château and the steep rocky hill of Montalban surmounted by a fortress. The city is divided into two parts by the Paillon River. The streets of the old town are narrow and crooked, but clean. The new town westward of the river is well laid out and handsome; it has a square surrounded by open arcades, and some of the houses near the sea and in the vicinity are very superior. The cathedral, several convents, hospitals, the governor's residence, college, library, theater, promenade jetty, with a huge building of Indian aspect, etc., are the principal public buildings.

There is a sailors' home, open to all English-speaking sailors, and the Protestant hospital, also for the use of seamen, as well as for all British subjects generally.

The population in 1911 was 142,940, including the floating population.

Consul.—The United States is represented by a consul and vice consul.

Weather.—The sea breeze, which prevails every day with a regularity almost equal to that of a tropical climate, moderates the summer heat. The principal disadvantage of the position of Nice is that, being open to the west, it is exposed, with but little protection to the influence of the mistral or violent northwest winds; the northeast wind is also often keen and piercing.

Barometer and thermometer.—The mean annual temperature at Nice, as derived from observations made during 15 years, is 58.5°; the mean monthly temperature in the coldest month, January, is 45.5°, and in the warmest, July, 72.7°. The mean annual height of the barometer, as derived from observations made during the same period, is 30 inches; the mean monthly height in April, the lowest, is 29.90, and in January, the highest, is 30.13.

Trade.—There are manufacturers of silktwist, snuff, soap, essences, candied fruits, sirups, marqueterie, perfumery, and paper, also an extensive cultivation in flowers. The imports consisted chiefly of coal, cereals, flour, wine, oil, etc.; the exports were olive oil, wines, liqueurs, glass, pottery, fruits, soap, coal.

Water.—Water of fair quality can be procured from the quays, where there are standpipes; there are two tank vessels, one of 14 and the other of 40 tons.

Supplies.—Provisions and supplies can be obtained.

Coal.—About 90,000 tons of coal are imported annually; at least 500 tons are kept in stock.

Communication.—The Paris, Lyon, and Mediterranean railroad continues through Nice to Ventimiglia; there is also a railroad to Digne, about 93 English statute miles to the northwestward. Steamers run frequently to Marseille, Leghorn, Corsica, and Genoa. There is telephonic communication between Nice and Paris.

Cape Nice forms the southwestern extremity of Villefranche Bay, and is high and steep, with a battery at each point; on its summit (Mount Boron), 600 feet high, is the ruin of a windmill.

Villefranche.—The entrance to the bay of Villefranche, between Gaton Point and a narrow wooded peninsula which projects nearly 2 miles to the southward, terminating in Malalongue Point, is a little more than 1 mile wide. The southern end of the peninsula, which forms the eastern shore of the bay, is high and cliffy, rising to a ridge of moderate elevation, named Mount Cauferat, on which is a semaphore, 482 feet above the sea. Between Gaton Point and Figliera Point on the east the bay is nearly 1,400 yards wide; thence it extends northward for nearly $1\frac{1}{4}$ miles, gradually narrowing toward the head and having depths of from 40 fathoms at the entrance to 8 fathoms at the inner end of the bay.

Just within the western point of entrance the shore is cliffy as far as the lazaretto, where there is a small pier; 800 yards northward of it is the arsenal, with a pier projecting 300 yards 34° , forming on its west side a basin 656 feet long, 394 feet wide, 105 feet wide at entrance and depth in entrance of $17\frac{3}{4}$ feet, but there is only room for one vessel of moderate size alongside the mole. This port is reserved exclusively for French Government vessels; the depths are 9 to 22 feet alongside the mole. The citadel and town stands a short distance northward of the mole; the latter is built in the form of an amphitheater, and contains a population of about 4,425. At the head of the bay is the railroad tunnel and station, and between the citadel and town the mole of the health office, with a large octagonal tower built on a projecting rocky point. The shore is clear of danger, there being a depth of 5 fathoms at the distance of 100 yards.

The eastern shore from Malalongue Point to 1 mile within the entrance is bold and cliffy; from thence it is bordered by shallow water which extends off about 250 yards, nearly filling up the bay between Pilone and Grassuet Points, off which is the anchorage of Espalmador, which is used by vessels during easterly winds, but which should be quitted with those from southwest.

Dock.—See Appendix I.

Grassuet Point, on which is a battery east-southeastward of the citadel, is low and surrounded with rocks.

Rube Rocks.—A red buoy, with triangular topmark, is moored at 200 yards southwestward of these rocks, and a red and black buoy, with spherical topmark, at 300 yards south-southwestward of them.

Winds.—During strong easterly or westerly winds, heavy squalls blow down through the breaks in the land around the bay.

The prevailing winds during the winter months are from the eastward, sometimes blowing hard and accompanied by rain and mist; these winds, when there is southing with them, send a dangerous swell into the bay, causing vessels to roll heavily. Southerly winds also send in a heavy swell.

Lights.—A flashing white light, visible 22 miles, is exhibited at 110 feet above the sea from a white octagonal tower situated on Malalongue Point (Cape Ferrat).

On the extremity of the arsenal mole an unwatched fixed red light is shown from a platform 26 feet above the sea; visible 6 miles in clear weather.

At the extremity of the small mole near the health office at the south end of the town, a small unwatched fixed red light is exhibited from an iron column at 33 feet above the sea, visible 5 miles. (See Light List.)

Life-saving station.—There is a life-saving station at Villefranche.

Anchorage.—The best anchorage is off the town, or with the citadel and Fort Mont Alban (on the heights west of the bay) in line; it is not considered safe to lie at single anchor, as very strong gusts of wind often blow down the gullies from the northeastward; but in fine weather vessels will sometimes anchor in about 8 fathoms with a hawser to the shore. It is advisable never to anchor southward of a line joining the arsenal mole to Grassuet Point Battery.

Mooring Buoys.—There are 11 sets of moorings laid down. The buoys are numbered commencing from the north; Nos. 1, 2, and 3 are reserved for French naval vessels, but the others may be used by vessels of any nation.

The mooring buoys are small wooden casks, and owing to the confined nature of the harbor, care is necessary in a fresh breeze to keep the vessel in position while taking in the small chain before coming to the large moorings. Two mooring buoys in L'Espalmador Bay are reserved for the yacht belonging to the King of the Belgians.

It is not advisable to take in the outer moorings, as they lie so close to the shore that in the event of carrying them away there would be no room to let go an anchor to bring the vessel up.

Supplies.—Coal is difficult to obtain; the only stores are at Nice, and is procured by rail. Water can be procured at the town.

Repairs.—Small repairs can be effected.

Dock.—See Appendix I.

Communication.—There was a regular passenger service between America and Villefranche during 1911, run by the White Star, Cunard, and the Hamburg-American companies.

Landing.—The landing for boats is at the mole of the health office, there is also landing at Passable, in the southeastern corner of the bay.

Voet Rock, lies 300 yards 303° from Malalongue Point lighthouse and nearly 100 yards from the shore; it is marked by a red beacon with triangular topmark.

St. Hospice Point, a little more than 1 mile to the northeastward of Causinière Point, is low and projects to the eastward, forming the southern extremity of St. Hospice Bay; on the point is the tower and chapel of St. Hospice. Between the point and Causinière Point are two small rocky bays open to the south; that to the east is named Fosse and the west Lilong; they are suitable only for coasting vessels, to which they afford shelter during northerly winds.

Life-saving station.—There is a gun life-saving apparatus at St. Hospice.

St. Hospice Bay.—From St. Hospice Point the coast trends northward and northeastward to Cape Roux. This bay, which is open to the southward and eastward, affords good shelter for vessels of all sizes during westerly winds in from 5 to 14 fathoms, sand and weeds, at 800 or 1,000 yards from the shore.

Port St. Jean.—The small bays of Scaletta and St. Jean are used by vessels chiefly engaged in the tunny fishery; the latter, in the southwestern corner of St. Hospice Bay, is the most frequented, as it has a small harbor formed by two short moles, sheltering a space 328 feet long, 460 feet wide, and 124 feet width at entrance, with a depth of 13 feet over sill.

In the northern part of the bay are two other boat harbors, that of Fourmis, where the distance across to Villefranche Bay is only 400 yards, and Beaulieu, where there is a fort. At 500 yards 51° from Beaulieu Point, and about $\frac{1}{4}$ mile from the shore, there is a rocky shoal named Sèche de Beaulieu, with $2\frac{1}{2}$ fathoms water on it; another, of $2\frac{1}{2}$ fathoms, named La Galiote (Galiot Rock), lies 100 yards southward of Cape Roux.

Light.—A fixed red light, elevated 31 feet above the sea, is exhibited from an iron standard on the East Mole head of Port St. Jean, visible 5 miles. (See Light List.)

Cape d'Aggio.—From Cape Roux the coast is high and trends eastward, forming two bays, as far as Cape d'Aggio, distant $2\frac{1}{2}$ miles; about $\frac{3}{4}$ mile northward of the cape is the summit of a mountain named Tête de Chien, 1,880 feet high.

The intermediate coast is clear of danger, except some rocks which lie about 200 yards off; on Cape d'Ail (d'Aggio) is a battery.

Life-saving station.—There is a gun life-saving apparatus at Cape d'Aggio.

Port Monaco.—At 1 mile to the northeastward of Cape d'Aggio is the town of Monaco (which contains a population of about 22,956), on a steep rocky eminence forming a peninsula and projecting eastward. The small port on the northern side of the town is 500 yards wide, 600 yards deep, but exposed to easterly winds; with westerly winds it affords good shelter for small vessels in from 6 to 8 fathoms, sand and mud. At the head of the bay the water is shallow nearly 200 yards off. Northwest winds blow with great violence, and with easterly winds landing is difficult. Monaco will be easily recognized by its fortifications, and by the Table de Monaco, or Mont Agel, 3,770 feet high, $1\frac{1}{4}$ miles northward of the town; northwestward of the town is the ruin of the ancient tower of Turbia, 1,843 feet high.

Vessels are moored off the platform which serves as a landing in 8 to 11 fathoms, with port anchor down, and hawsers to the rocks at the foot of the fortifications and stern anchor out. A large vessel can anchor in about 17 fathoms with the stern secured to a white buoy in the center of the port. The landing place can not be used by boats drawing more than 2 feet of water.

Two breakwaters shelter the port; the southern, 558 feet in length, has a northerly direction from Fort St. Antonio, the other (constructing) projects in a southerly direction for a similar length from the northern side of the port, leaving an entrance between 328 feet in width, with a depth of 16 fathoms, and inclosing an area of nearly 40 acres.

The port is open to all international commerce, receiving at the quay vessels of 22.9 draft of water. Also this harbor can receive vessels drawing 27.9, which, however, must lighten themselves at some distance from the quay by discharging a part of their cargo into lighters, afterwards approaching and discharging at the quay. Just at present (1916) there are no discharging cranes on the quay, but plans are being made to have such cranes in the near future. The discharging is effected by windlasses on board the vessel and by workmen, and discharge is about at the rate of 250 tons per day. It is also possible to rent from the port authorities a movable crane which can lift 40 tons, but there is no absolute assurance that this crane can be had on a particular day or for a particular rate.

A broad quay, 1,328 feet in length, has been constructed on the southern side of the harbor and has depths of from $3\frac{1}{2}$ to $5\frac{1}{2}$ fathoms alongside, except at the two ends, where for a length of about 60 yards it is shoal.

There is along the quay one railroad line which connects with the main line of railroad of the district. Port pilotage is not obligatory, but the authorities furnish a pilot and the necessary workmen for

mooring purposes at a very reasonable charge. There are no port dues.

The customs duties are in the charge of the French Government, and all the rules of the French customs apply to Monaco. Sanitary charges are completely distinct from pilotage charges.

Communication.—Monaco is connected directly by rail with Paris, Lyon, and Mediterranean Railway, and the tunnel at Monaco has been pierced. There is a monthly direct winter service for merchandise from London to Monaco (General Steam Navigation Co.).

Pilots.—The employment of a pilot is optional.

The principal imports are coal, cereals, and wine.

Trade.—The principal imports are coal, cereals, and wine. The principal article of export is beer.

Coal.—A supply of coal can not be relied upon, but is ordered from Nice when required. A little might be obtained from the gas-works or from the merchants in the town.

Water.—Very good water is obtained by hose over the quay.

Lights.—A fixed red light is exhibited, at an elevation of 49 feet, from an octagonal masonry tower, situated on the extremity of the southern breakwater. This light is visible from a distance of 12 miles.

A fixed green light, visible 12 miles, is exhibited, at an elevation 48½ feet above the water from an octagonal masonry tower situated on the extremity of the northern breakwater. (See Light List.)

Cape Martin, is of moderate height, wooded, and slopes regularly on all sides, terminating in a low point on which is a battery. On its summit is a white semaphore, 272 feet above the sea, which is very conspicuous from the offing; and on a slight elevation near the extremity of the cape is a grand hotel; 1½ miles 303° from it is the small town of Roque-brune, above which is a crag in the form of a tower, 774 feet high. The intermediate coast from Monaco is high and forms a bight 1 mile deep, with some rocky shoals at the distance of 400 yards.

Anchorage.—There is anchorage with land winds on both sides of Cape Martin, that on the westward called the Bay of Roque-brune; vessels anchor northward of a line joining the cape and Vielle Point in 8 to 11 fathoms, sand and weeds, with the semaphore bearing from 90° to 101° 30', taking care to avoid the rocks which extend 400 yards from the coast; in this anchorage Cape Ferrat Light will be masked by the town of Monaco.

To the eastward of the cape the anchorage is in 5 to 6 fathoms sand, mud, and weeds, northeastward of the semaphore, and at 600 yards eastward of a small white chapel. Vessels should be always prepared to leave on any signs of winds from seaward.

Mórtola Point is low and projecting; rocks and shallow water extending fully 700 yards from it.

Menton.—The coast between Cape Martin and Mórtola Point forms a bay with a sandy beach, and about midway upon a slightly projecting point is the town of Menton, or Mentone, containing a population of about 9,000. This town, formerly belonging to the principality of Monaco, was in 1852 attached to Sardinia and in 1860 ceded to France. It has a small trade in fruit and oil and is much frequented by visitors and invalids during the winter months, when the temperature ranges between 46° and 58° F. A few miles eastward of Menton is the boundary between France and Italy.

Quay.—At Menton there are 1,200 feet of quayage, with a depth of 15 to 21 feet alongside.

Communication.—Menton is on the Paris, Lyons & Mediterranean Railroad, which is close to the coast.

Trade.—The principal import is coal. The chief articles of export are wheat, olive oil, and lemons.

Supplies are plentiful and good and can be readily obtained; water can be procured free from fountains on the pier.

Coal.—About 3,000 tons of coal are imported annually and 200 tons kept in stock by one firm. There is a coal wharf 300 feet long with a depth alongside of 21 feet.

Anchorage.—The harbor of Menton is formed by a pier 437 yards long, within which are depths of 19 to 20 feet. Coasting vessels anchor during offshore winds, off the town, in 8 or 9 fathoms water. During strong northwest winds heavy squalls blow down through the breaks in the mountains. Vessels of 18 feet draft can enter the port; they are moored with their own anchors head to the eastward and stern hauled in to rings on the rocks at the bottom of the port.

In fine weather vessels anchor in from 6 to 8 fathoms, sand and weed, 200 to 400 yards eastward of the molehead. Large vessels anchor farther seaward in from 14 to 17 fathoms, in order to be in a favorable position should southeasterly winds set in. Avoid anchoring on Roche Castellar, with 10 fathoms water, situated 600 yards southeastward of the molehead.

Light.—An occulting white light, elevated 53 feet above the sea and visible 12 miles in clear weather, is exhibited from a white metal turret 30 feet in height, situated on the pierhead at Menton.

Buoy.—A warping buoy is situated at the entrance to the harbor.

Life-saving station.—There is a rocket life-saving apparatus at Menton.

Directions.—The Table de Monaco, a high mountain, the summit of which is flat, and the Aiguille de Menton, or Mont Bandon, a

peaked mountain 4,157 feet high, 3 miles to the northward, are good marks for vessels making this part of the coast; at the back of these mountains are the higher chain of the Alps, always covered with snow. At about 8 miles southward of Villefranche Lighthouse the Aiguille de Menton appears as a double peak.

The coast from Port de Mentone trends eastward about 1 mile to the little Rivière Saint Louis (Fiume San Luigi), and the 5-fathom curve is from 400 to 600 yards off it. On the coast close eastward of the mouth of the river is an iron triangular mark, of white horizontal laths with open spaces between, point upward, on a masonry pillar, and about 200 yards to the northward is a white triangular mark, point downward, painted on a rock northward of San Luigi Bridge.

CHAPTER III.

NORTHWEST COAST OF ITALY, CAPE MARTIN TO PIOMBINO— GULF OF GENOA.

Northwest coast.—**Ventimiglia** (ancient *Albium Intermætium*), at about $5\frac{1}{2}$ miles eastward of Cape Martin, is a fortified town surrounded by a wall, situated at the foot of a tract of elevated land; and contains a population of about 14,571. Being on the boundary between France and Italy it is an important military position, and here is the international railroad station. Above it on the west is a fort and on the east is the Roja River (crossed by a long narrow bridge), with the village of St. Agostino on its left bank. The coast between Mortola Point and Ventimiglia is high and richly cultivated.

Bordighera.—From Ventimiglia the coast trends east-southeastward 3 miles to Cape Bordighera, which is of moderate height and has a tower on it. The intermediate shore is a beach clear of danger, through which the Rivers Roja and Nervia flow into the sea. The small town of Bordighera, with a population of about 4,388, situated on the east side of the cape, is surrounded by walls, and at a distance has the appearance of a fortress; it is a popular winter health resort; westward of the town are some fishermen's huts. In this neighborhood the date palm is cultivated and there is a considerable export trade in flowers.

Communication.—There is a railroad station at Bordighera; an electric tramway runs to Ventimiglia. The telegraph office is open at limited hours.

Anchorage.—With offshore winds, coasting vessels anchor in front of the town, in 9 or 10 fathoms, sand and mud; should the wind shift to the southward, the roadstead must be abandoned.

Cape Pino is high and rounded, projecting to the southeastward, and has a square tower on it and a zig-zag road up its south face which shows distinctly from the southward. Between the two capes the coast forms a bay with a sandy beach nearly 1 mile deep, where with offshore winds, vessels may anchor in from 8 to 10 fathoms. On the western side of the bay, near a battery, is a chapel, and nearer Cape Pino is the Village of Ospedaletti. A shoal on which is only a

depth of 1 fathom, lies 1 mile northeastward of Cape Pino, at about 200 yards offshore.

Porto di San Remo is within South Mole, which extends 550 yards eastward from the southeastern angle of an old fort, now a prison, on the beach southeastward of the town; near the middle of the mole is a quay 160 feet long. North mole extends about 50 yards eastward from the harbor master's office, which is situated about 200 yards northward of the inner end of South Mole. The depths in the middle of the port were from $2\frac{1}{2}$ to $3\frac{1}{4}$ fathoms, but a freshet in Torrente San Francesco, which flows into the port northward of the harbor master's office, brought down a considerable quantity of sand and stones into the harbor; the greatest care is now necessary in entering the port, and South Mole should not be approached without information as to the depth having been obtained from the harbor master's office; dredging is in progress (1912).

There is a local iron foundry, and six hydraulic cranes for discharging cargo.

Anchorage.—There is anchorage in about 7 fathoms, sand, and good holding ground, about 400 yards eastward of South Molehead, but it is safer to lie farther out as it is open to the southward.

San Remo town is in two parts, one, the old part, on the steep slope of a hill, and the other, the new part, extending along the shore. In addition to the hotels, there are numerous villas, amidst flourishing palm trees, in contrast with the oak and pine woods which cover the hill to its summit. The church della Madonna della Costa, with a white cupola, is on the hill behind the old town, and is conspicuous from all directions seaward. The town is frequented by invalids in winter. The population was 24,292 in 1911.

Buoys.—Two green mooring and warping buoys lie about 200 and 500 yards, respectively, eastward of the Inner Mole light.

Lights.—An occulting red light, elevated 32 feet above the sea and visible 8 miles, is exhibited from an iron standard over shed, situated about 22 yards from the head of the South Mole.

From an iron standard at the head of the North Mole, elevated 33 feet above the sea, is exhibited a fixed green light, visible 5 miles. (See Light list.)

Trade.—In 1913 the imports were coal and general merchandise. The chief products are olive oil, lemons, wine, and flowers.

Communication.—There is a station of the Ventimiglia and Genoa railroad at San Remo. There is telegraphic communication.

Hospital.—L'Ospedale Mauriziano, near the Church della Madonna della Costa, has 75 beds.

Two sunken rocks lie about 200 yards off the beach, in the bight between the port and Cape dell' Arma, and there are others a short distance off the cape.

The coast, from Porto di San Remo trends eastward about 2 miles to Cape dell' Arma. A bank, with less than 5 fathoms water, extends from 300 to 600 yards off it.

Cape dell' Arma is steep, and bordered by rocks. The little chapel di Nostra Signora della Guardia is on a hill, 400 yards northward of the cape, and surrounded by woods.

Monte Calvo, $\frac{3}{4}$ mile northwestward of the chapel, is 709 feet high, and Poggio Village is on a hill, about 600 yards northward of Monte Calvo. Bussana Vecchia, on a hill, 672 feet high, $1\frac{1}{4}$ miles northward of Cape dell' Arma, is conspicuous.

Light.—A group flashing white light, elevated 165 feet above the sea, and visible 19 miles, is exhibited from a stone tower 47 feet in height, situated near the extremity of Cape dell' Arma. (See Light list.)

The coast.—A slightly embayed coast trends about $3\frac{1}{2}$ miles 73° to Santo Stefano Point, on which is a tower; about the middle of the bay is Taggia River, westward of which is the village of Arma, and to the eastward, those of Riva and Santo Stefano. With the exception of two small rocks off the latter villages, the bay is clear of danger. The point, however, should not be approached within $\frac{1}{2}$ mile, as shoal water extends off it.

The coast from Cape dell' Arma trends eastward $3\frac{1}{2}$ miles to Stefano Point. A bank with less than 5 fathoms water extends from 300 to 800 yards off it. Torrente dell' Arma flows into the sea 800 yards northeastward of the cape, and Bussana Nuova Village, close northward of its mouth, has a church with a campanile surmounted by a bronze statue. Arma Village extends along the coast northeastward of Bussana Nuova, and near its western end is an old large dark square tower.

Shoal.—A detached shoal, with 2 fathoms water, extends about 600 yards southward of Torre dell' Arma.

Anchorage.—There is temporary anchorage, with offshore winds, in about 7 fathoms water, and Torre dell' Arma, bearing 300° distant nearly 600 yards.

Pier.—An iron pier projects about 190 feet seaward from the coast in front of Arma Village; there is a depth of 12 feet at its outer end.

Buoys.—There are two mooring buoys for torpedo boats in Santo Stefano Bay.

Porto Maurizio.—The village of San Lorenzo, 3 miles 67° from Santo Stefano Point, is famous for its olives; there is a tower on the hill $\frac{1}{2}$ mile to the westward of it, and another on the point 1.3 miles to the eastward; $5\frac{1}{2}$ miles to the eastward of Santo Stefano Point is the picturesque old port of Maurizio. The town stands upon

a neck of rising ground, is fortified, has a cathedral, and contains a population of about 8,280. There is an export trade in olive oil, lithographic stones, etc.

A short distance eastward of the town is the harbor, formed by two moles, the South Mole projecting toward the southeastward, and the North or Inner to the south, leaving an entrance between them of over 100 yards. Within the port, at the inner end of the South Mole, a small Transverse Mole has been built, and a quay has been constructed on the northwestern side.

The port is only available for vessels of less than 18 feet draft of water. There is a small slip at the northern side of the port.

The coast is much exposed to all but northerly winds, but with favorable weather vessels may anchor in from 5 to 7 fathoms water, at $\frac{3}{4}$ mile from the shore.

Works.—The South Mole is being extended; works are in progress. Vessels should pass eastward and use caution.

The towns of Porto Maurizio and Oneglia are to be united under the name of Imperia, and a large harbor is to be constructed, having railroad communication with Turin. (See Light List.)

Buoys.—Two mooring buoys are situated at 196 yards 110° and 219 yards and 288°, respectively, from the green light on the North Mole.

Trade.—The principal industries are cotton and woolen goods. Wine, oil, fruit, vegetables, and cattle are produced in the neighborhood.

Anchorage, open, except to northerly winds, can be obtained in favorable weather in 7 fathoms water, sand bottom, about 400 yards northeastward of South Molehead.

Supplies.—Water can be obtained on the quay on application of the tax office.

Repairs.—There is a building slip and workshops for wooden vessels near the root of North Mole.

Hospital.—The municipal hospital has 50 beds, and receives foreigners.

Lights.—From an iron standard, 14 yards inside the North Mole Head, elevated 33 feet above the sea, is exhibited a fixed green light, visible 2 miles.

From an iron standard at the head of the South Mole, elevated 41 feet above the sea, is exhibited an occulting red light, visible 10 miles.

From the end of the Transverse Mole a small fixed white light is exhibited. (See Light list.)

Oneglia.—About 3 miles 67° from Maurizio Point is Cape Berta, round which there are a few scattered rocks, but at no great distance from the shore. In the center of the bay between Maurizio Point

and Cape Berta are the town and port of Oneglia. The harbor is artificial, with quay accommodation for a few small vessels; the entrance is narrow and small room to swing. This harbor is not recommended for large vessels. The town, containing a population of about 10,487, stands on a plain by Impero River, which is crossed by a suspension and a railroad bridge; Mount Bardelin and another hill, upon which is castel Vecchio, slope down from above $\frac{1}{2}$ mile on its western side. The exports are oil, wines, and fruits, the figs in the district being celebrated. The principal industry is the manufacture of macaroni, and wine, oil, fruit, vegetables, and cattle are produced in the locality.

A port similar to that of Maurizio is formed to the east of the river by two moles, the eastern projecting out in a southwestward and the western in a south-southeastern direction. There is 21 feet of water in the entrance, and the eastern and northeastern portions are being dredged to 19 feet. The anchorage is off the town on muddy ground in any convenient depth, but is exposed to winds from the southward.

Buoys.—There are two mooring buoys within the port for small craft, and one at 200 yards 230° from the Eastern Mole Head.

Lights.—From an iron standard on the East Mole Head, at an elevation of 26 feet above the sea, is exhibited an occulting green light, visible 10 miles.

From an iron standard on the West Mole Head, at an elevation of 19 feet above the sea, is exhibited a fixed red light, visible 5 miles. (See Light List.)

Supplies.—Fresh provisions and water are obtainable. Coal supply unreliable. Water can be obtained from the quay of West Mole.

Repairs.—There are two yards where wooden vessels are built.

Hospital.—The civil hospital has 75 beds, and receives foreigners.

Communication.—There is a station of the Ventimiglia and Genoa Railroad at Oneglia, and there is telegraphic communication.

Firing practice with rifles is sometimes carried on from a station between Oneglia and Cape Berta at the rock to the eastward of the cape, and also from the inner end of the rock at a rise at its outer end; a red flag is hoisted at the firing stations, and at the outer end of the rock during the practice, when vessels should pass some distance from the cape.

Cape Mele is high and rounded, covered with olive trees, and a short distance inland attains an elevation of 725 feet; west-northwestward from it are the mountains of Chiappa and Evigno; the former (1,775 feet high) distant $2\frac{1}{2}$ miles from the cape, and the latter (3,245 feet high) $7\frac{1}{2}$ miles. Nearly midway between Capes Berta and Mele is a less conspicuous peak called Cervo, near a village of the same name; other villages are scattered along the shore, one of which,

named Diano Marina, with a castle, overlooks the roadstead westward of Cervo; it was nearly destroyed by the earthquake of 1877; Rovera is 1 mile nearer the latter cape, with a stream on each side and a small sunken rock near the mouth of the eastern one.

Diano roadstead, off the village, affords anchorage in 8 fathoms water, sand bottom, with the campanile bearing about 309° true, and $\frac{1}{4}$ mile from the shore; the anchorage is open except from the north-westward.

Rovero (Rovere) Village, on a little hill about 400 yards inland, has a white campanile with a small red cupola. Cervo Village is on a little conical hill near the sea, and at its highest point is a church with a campanile; the railroad viaduct below the village is of masonry with six arches. Seaward of the western end of the viaduct is a rock with 6 feet of water.

Cape Cervo, immediately eastward of Cervo Village, is steep and rocky; there is about half of a very old tower on it. Rollo and Andora villages are on the coast between Cape Cervo and Cape Mele, a river flowing between them to the sea.

Light.—A flashing white light, visible 20 miles, at an elevation of 308 feet above the sea, exhibited from a yellow octagonal tower 82 feet high, situated on the slope of Cape Mele. (See Light list.)

Semaphore.—There is a semaphore station on Cape Mele. The semaphore on Cape Mele is in telegraphic communication with San Benigno semaphore at Genoa, and vessels bound to that port can advise the Consorzio Autonomo of Genoa (established to receive messages concerning the movements of vessels) by hoisting letter C of the International Code after the signal has been hauled down. Vessels proceeding to Genoa are requested to signal their names to Cape Mele in order to facilitate arrangements for their arrival.

The Gulf of Genoa (ancient Mare Ligusticum), lying between Cape Mele on the west and Tino Island on the east, is between these points about 73 miles across and 27 deep, the Maritime Alps and Apennine ranges approaching within from 5 to 18 miles of the coast. The shores of the gulf are rocky and precipitous, flanked by lofty mountains, between which are well-cultivated valleys varied by a succession of picturesque towns and villages.

The division between Var and Genoa is known as the Riviera di Ponente or western beach; that between Genoa and Spezia the Riviera di Levante or eastern beach; the shore may be safely approached to a distance of 400 yards. There are, besides the port of Genoa (near the head of the gulf), safe harbors for sailing vessels and several good roadsteads.

Soundings.—In the Gulf of Genoa the water is deep, the 5-fathom curve in no place extending 400 yards from the shore, nor that of 10 fathoms $\frac{1}{2}$ mile; 15 miles from the head of the gulf and 2 miles from the western shore, the depths increase abruptly from 100 to 300 fathoms, the bottom being mostly mud.

Alassio.—Between Cape Mele and the sharp point of San Croce is a bay with a sandy beach about 1 mile in depth; the bay is clear of danger with the exception of a sunken rock lying 1 mile northwest from the cape at about 300 yards offshore. On the beach, $1\frac{1}{2}$ miles from Cape Mele, is the town of Laigueglia, 2 miles northward of which is the small seaport town of Alassio; the town contains a population of about 3,800, has a very imposing appearance, and contains some large buildings, among which the steeple and dome of a church are conspicuous; it is fortified, has a short mole, and is a rising winter resort.

Anchorage.—There is anchorage in the above bay in any convenient depth; the best berth is with the church of Alassio in range with another farther island, the bottom of sand and mud. The current here sets to the southwest, so that vessels do not always ride head to wind.

Light.—A fixed red electric light is erected on the beach at Laigueglia. (See Light list.)

Lena Point is low with a sandy shore, and between it and San Croce Point is a small bay, on the shores of which are some houses, a church, and two towers.

Gallinara Island, $\frac{3}{4}$ mile southward of Lena Point, is 285 feet high and has a tower on it. In mid-channel between the island and the mainland are depths of 6 and 7 fathoms, a patch of $3\frac{1}{4}$ fathoms lying off the north point of the island. Vessels anchor to the westward of Gallinara with a stern fast to the shore of the island.

Albenga (the Roman Albium Ingaunum) is a pretty but unhealthy town on a branch of the Arosia River; it has several remains of antiquity, a gothic cathedral and some old castles. Hemp is grown here, and Albenga is famous for the fruit grown in the neighborhood. The population is about 4,000.

The coast.—From Lena Point the coast northward forms with Cape Noli, a bay of $2\frac{3}{4}$ miles deep extending 13 miles northeastward; it is encircled by a range of lofty mountains, the summit of which, Mount Carmo (4,557 feet in height), is midway between the above-mentioned points and a little more than 4 miles from the coast. Several streams flow into the above bay, and villages and towers border the shore and heights above.

The entrance to the Arosia River is $1\frac{1}{4}$ miles northward of Lena Point; the freshes of this river are often very destructive. The vil-

lages of Ceriale and Borghetto, between which are the peaks of Mount Croce (1,781 feet high), are respectively 2 and 3 miles northward of the mouth of the river. The Toirano River enters the sea a short distance northward of the latter village. One mile northward of Borghetto is the town of Loano or Lovano, near the Nimbardo River; it is walled and defended by a castle, and has manufactories of soap and lace.

Cape Finale.—Four miles northward of Loano is Cape Finale; on it is a tower, and on the intermediate coast are the villages of Pietro, Borgio, and Verezzi.

Finale.—On the northern side of the cape, situated between two torrents is the scattered town of Finale. Off Finalemarina is an insecure anchorage, which, with the adjacent coast, is fronted by a sandy beach. The country around produces fine oranges, and there are several factories of bronze, linen, and paper in the neighborhood. On an elevation of 876 feet, between the streams, is a chapel. the slopes of the neighboring hills are in places thickly wooded, and numerous dwellings stud the country in the vicinity. On the point $1\frac{1}{2}$ miles from Capt Finale is a tower, nearly 2 miles eastward of which is the village of Varigotti, with a tower and battery on Crena Point, the bluff eastward of it.

Anchorage.—Along the shore westward of the battery is a sandy beach, and several off-lying rocks, but none at any great distance from the shore, a depth of 5 fathoms being found within 300 yards of it. Under favorable circumstances anchorage may be taken up off Loano or abreast Finale, but there is no shelter except from northerly and westerly winds; the bottom is sand and mud.

Cape Noli, the northern boundary of the bay before described, is high, steep, and bold-to, a depth of more than 200 fathoms being found 1 mile southeastward from it.

Semaphore.—On the summit is the ruin of St. Margarita Chapel, and near it, at an elevation of 902 feet, a semaphore telegraph station.

The coast.—From Cape Noli the coast forms a bend to a wooded point upon which is a tower, $2\frac{1}{2}$ miles distant; it is fronted by a sandy beach and without any dangers. About halfway between it is the torrent of Cercallo, and upon the shore on either side the villages of Noli and Spotorno, the former to be recognized by a tower; and on the high land over it, the church and village of Vozze. Spotorno contains extensive shipbuilding yards.

Bergeggi Islet lies off the northern point of the bay, between which and the islet is a channel about 400 yards wide, having a depth of 6 and 7 fathoms water. The islet is bold, about 200 feet high, wooded, and on its summit is a church in ruins.

Cape Vado.—Off a sharp point a little northward of the tower on the northern point of the above bay are a few rocks above water, the

coast, which is steep and inaccessible, is otherwise bold to Cape Vado; the village of Bergeggi stands on the shore, and toward the cape are the well-wooded slopes of Mounts Mao and St. Elena. The cape, with the exception of some scattered rocks close in, is steep-to with 100 fathoms at the distance of 1 mile; on its summit are the ruins of Fort St. Stefano.

Breakwater.—A breakwater extends 150 yards in a northeasterly direction from this cape, thence 38 yards 31° , and 98 yards 10° .

Light.—A flashing white light, elevated 142 feet above the sea and visible 17 miles, is exhibited from a yellow octagonal tower, with dwelling attached, 114 feet in height, situated on a rock near the eastern extremity of Capt Vado; within 5 miles a faint continuous light is seen. (See Light List.)

This light is not visible from the anchorage northward of Cape Vado; and to the southward it is obscured by Bergeggi Islet. (See Light List.)

Vado.—The coast from Cape Vado to Savona, to the northeastward, forms a bay 1 mile in depth, in the southwestern part of which is the small port of Vado on the Segno River. It is defended by Fort San Lorenzo on the south; between it and the cape is a suburb and church of the same name, and also a small fort.

Off Fort San Lorenzo are some rocks. The shore must therefore not be approached too closely. Anchorage may be taken up in any convenient depth; 6 fathoms will be found at 400 yards from the shore and the holding ground is good. A considerable swell is sent into the bay with southeasterly winds, and with northwesterly winds there are sometimes heavy squalls from off the land.

Light—Vado.—A small fixed white light, elevated 49 feet above the sea and visible 6 miles, is shown from a gray staff, 30 feet high, on house at Fort San Lorenzo. (See Light list.)

Savona.—Northward of Vado are the villages of Zinola and Fornaci, and $1\frac{1}{4}$ miles from the latter is the seaport town of Savona; the stream or torrent of Letimbro, off the mouth of which is a rock, enters the sea between Fornaci and Savona. Savona (ancient Savo) is a place of some importance; contains a cathedral and other churches, a theater, palaces, hospital available for sailors, a British seamen's institute, etc., and on the southward of the town is a fort of considerable size and the large iron and steel works of the Società Anonima (Messrs. Tardy & Benech), the situation of this establishment being exceptionally good, having ready access both to the shipping and railroad.

The chief industry is shipbuilding; iron is manufactured in large quantities; and there are glassware, porcelain, silk goods, and common pottery manufactories and sulphur mills; it exports oranges

and other fruits grown in the neighborhood; the population is about 50,054.

The harbor.—The entrance, open to the northeastward, is between two moles; the southern or Traverse Mole projects 225 yards to the northward, thence northeastward 166 yards from the works which form the eastern side of new basin, the northern or Tramon-tana projects 152° about 160 yards from the western side of a rocky bluff on the north shore; the width of entrance is about 200 yards. Within are the Outer and Old Harbors and Victor Emanuel Harbor.

An area in front of the entrance to the port has been dredged to a depth of $29\frac{1}{2}$ feet. Harbor improvements are to be carried out, consisting principally of a new breakwater, about 1,575 feet in length, and a new quay.

Frangionde Mole extends about 440 feet beyond the Traverse Mole: from a point about 300 feet to the eastward of and beyond Traverse Mole; at the extremity, an arm extends about 70 feet north-westward.

Buoys.—Four buoys for the use of scows engaged in the construction work are moored in the following positions: 337 yards 45° , 403 yards 47° , 426 yards 67° , and 311 yards 77° from the light on the extremity of Frangionde Mole.

Harbor works—Lights.—Works are in progress (1915) for extending the quay at the inner part of Frangionde Mole, and a light is shown temporarily from a stone pillar about 87 yards north-westward of the light-turret on the head of the mole. A light-buoy, exhibiting a flashing red light, also marks the works.

Works are also in progress for the construction of a quay north-eastward of the harbor master's office, and are marked by red lights placed on piles.

Casse Mole, 980 feet long, projects seaward in a 102° direction from the northern end of eastern embankment of Victor Emanuel Harbor, and nearly at right angles to Traverse Mole.

Caution.—Vessels should not pass between the head of the mole and the lightbuoy, as the work is now nearly awash in several places.

Calata del Carbone—Caution.—From the northwestern side of the wharf three mooring chains extend to the mainland opposite, and anchorage should be avoided in the vicinity. The point where each chain commences is marked by two vertical stripes, one black and the other white, close together on the wharf.

Outer and Old Harbors.—Outer Harbor extends about 2,000 feet from the moles in a southwestern direction, gradually narrowing until it becomes 131 feet wide; it then turns to the southward for a farther distance of 550 feet and widens to about 270 feet, this latter forming the Old Harbor or basin, perfectly sheltered, with a depth

of 22 feet. The Outer Harbor has a depth of from 24 feet at the southwestern part to 30 feet at the entrance.

Victor Emanuel Harbor is on the eastern side of the Old Harbor, with its entrance at the northward and immediately within the Traverse Mole, by which it is protected from east-northeastward winds; approximately, it is 900 feet long, 600 feet average width, and at entrance 200 feet, with a depth of 29 feet. The railroad extends along the surrounding quays.

Coaling wharf separates Victor Emanuel Harbor from the approach to the Old Harbor. From the northern side of this wharf three mooring chains extend to the mainland opposite, and vessels should avoid anchoring in the vicinity. The starting point of each chain is marked by two vertical black and white stripes on the coaling wharf.

Directions.—In making Savona from the southward or eastward, the old convent of St. Giacomo on the northern side of the harbor is easily recognized at a considerable distance, and when brought to bear 270° the entrance is open and may be steered for. The deepest draft vessel that has entered the port is 24 feet, but a vessel of 25 feet draft can enter at high water.

Lights—Frangionde Mole.—An occulting red electric light, elevated 32 feet above the sea, and visible 4 miles, is exhibited from a red circular turret, 21 feet high, situated at the extremity of Frangionde Mole.

A fixed red electric light, elevated 8.2 feet above the water, has been erected on the inner branch of the Frangionde Mole, 87 yards 325° from the occulting red light, to mark the work of the prolongation of the arm of Frangionde Mole.

NOTE.—Temporarily extinguished (1916).

The work of prolonging the mole will soon (1915) be commenced.

Lightbuoy.—A red lightbuoy, showing an occulting red light, has been moored 164 yards from the present extremity of the mole, and this will be moved as the work progresses.

A fixed green light is exhibited from a green iron staff on square masonry base, 22 feet high, at the extremity of the Tramontana Mole, 32 feet above the sea, visible 5 miles.

Casse Mole.—A flashing white electric light, exhibited 82 feet above the sea and visible 14 miles from a skeleton iron tower situated at the head of Casse Mole.

Frangionde Mole Light and Casse Mole Light are not visible together, one being visible during the eclipses of the other, and vice versa.

Fortified port.—Savona is a fortified port. See Regulations.

Time signal.—A gun at the artillery barracks, S. Giacomo, is fired at noon standard mean time (23h. 0m. 0s. Greenwich mean

time). Five minutes before the above signal a red and white flag will be hoisted from the barracks in a position conspicuous from vessels in the harbor; and lowered at the moment the gun is fired.

In the event of the gun signal failing, it will be repeated at 1h. 0m. 0s. standard mean time (0h. 0m. 0s. Greenwich mean time), the flag remaining hoisted until that time.

Trade.—The principal articles of import at Savona are benzine, petroleum, broken and pig iron, stones and earths, mineral phosphates, coal, grain, etc. The principal exports are candied fruits, wooden hoops, cork, sulphur, coal, chestnuts, etc.

There are manufactories of iron, firebricks, bottles, and large works for building electric locomotives, etc.

Communication.—A railroad connects Savona with Genoa; also with the ports westward to Nice and northward to Turin.

An electric tramway has been constructed from Savona to Vado.

Coal.—There are usually about 36,000 tons kept in stock. There is no coal wharf; the coal is piled on the quay, where there is a depth of 23 to 24 feet. Vessels coal at the quay. About 2,000 tons of coal can be loaded in 24 hours.

Pilots are obtainable, as are also tugs. Pilots take charge of vessels 2 miles from Mola delle Casse.

Supplies are plentiful. Water is obtained from pipes on the quay. The bay of Vado is available for large vessels to coal from lighters; an extra charge per ton for towing expenses would be incurred.

Quarantine.—Vessels declared infected with cholera, plague, etc., are now disinfected at Savona.

Hospital.—The civil hospital of San Paolo, with 173 beds, receives foreigners; separate charges for medical and surgical cases, daily, paid for one month in advance; the charge for any days of the month not spent in hospital is returned.

Repairs.—There are facilities for executing repairs to hull and engines, etc., but no dry-dock accommodation.

The coast.—From Savona the coast trends northeastward 13 miles to the head of the gulf near Voltri and is of the same character as that previously described. Several streams flow into the sea, the largest of which, nearest Savona, are but small unless swollen by heavy rains. Towns and villages with apparently handsome dwellings are perched upon the elevated and well-wooded ground within. The principal village is Albissola, divided into two parts by the torrent of Sansobbia; one is upon elevated ground 1 mile inland, the other is on the shore with an old tower a short distance to the eastward. The village is fronted by a sandy beach, but between that portion called the Marina and Savona there are several scattered rocks for a distance of 400 yards off the shore.

Celle and Varazze are two small towns on the coast. The latter, $4\frac{1}{2}$ miles from Savona, is a thriving port where shipbuilding is carried on. It stands on a sandy beach, in a small bay, on the northern point of which is a tower. About $\frac{1}{2}$ mile within is Mount Guardia di Varazze, elevated 1,319 feet. About $2\frac{1}{2}$ miles beyond the tower is the village of Cogoletto, which claims to be the birthplace of Christopher Columbus.

Cape Arenzano is 2 miles eastward of Cogoletto; $\frac{1}{2}$ mile northward of it is the bay and village of the same name. Voltri lies 3 miles northeastward of Cape Arenzano, the villages of Vesina and Crevari lying between. Off the shores southwestward of Celle, Cogoletto, and Cape Arenzano are some scattered rocks, but none beyond 400 yards from the shore. Five fathoms will be found at about $\frac{1}{2}$ mile offshore and 100 fathoms at from 3 to 5 miles. The bottom is mostly mud and sand.

Voltri.—This flourishing town containing a population of about 15,688 is situated at the head of the Gulf of Genoa and 7 miles from the port of Genoa, with which it carries on an active trade by means of small coasting vessels. It contains extensive shipyards, machine shops and factories, has some fine churches and other buildings, a manufactory of paper, and sulphur springs in the neighboring valley of Leira which are much frequented.

Pegli Village lies eastward of the point just mentioned, and has a church with a white campanile. Torre Pallavicini, red, cylindrical, and 443 feet above high water, stands on a wooded hill northward of the church.

Light.—A light is exhibited, at 23 feet above high water, from an iron standard on the shore, eastward of a gray castellated house near the western end of Pegli Village.

Torrente Varena, eastward of Pegli and between it and Mulledo Village, is crossed by a masonry bridge with five arches.

Sestri Ponente, about $1\frac{1}{2}$ miles eastward of Pegli, is situated within a long and straight beach, at the eastern end of which is a small rocky peninsula surmounted by the noticeable Castello Raggio. Three short iron piers, furnished with rails, and cranes on their heads, project from the beach; there are depths of 13 and 15 feet at their heads, off which there are generally buoys for the use of the coasters with materials. The principal industry is shipbuilding, carried on at Ansaldo and Odero yards and foundries.

The population was 21,607 in 1911.

Bric del Gazo, a conical mountain, 1,381 feet high, is about $1\frac{1}{2}$ miles northward of Sestri Ponente; it is surmounted by a conspicuous sanctuary.

Cornigliano, immediately eastward of Castello Raggio, has several chimneys, one of which is very high and conspicuous.

Torre Moiselli or Spronati, 587 feet, and Campanile di Coronata, 443 feet above high water, and of a dirty white color, are northward of the village.

There are several short moles off the village, but they are unsuitable for landing.

Torrente Polcevera separates Cornigliano from Sampier d'Arena, and is crossed, near its mouth, by a long iron bridge.

Sampier d'Arena (San Pier d'Arena) is noticeable by the great number of chimneys, the large workshops, and the houses blackened by smoke. Campanile di Belvedere, on a hill northward of the town, is 420 feet above high water, and red in color.

The principal industries are shipbuilding, iron works and foundries, soap manufacture, and making extract of logwood.

The population was 76,500 in 1911.

Cape del Faro (San Benigno) is a small rocky projection, and near its extreme point is a battery, northward of which, and about 200 yards from the point, is a lighthouse on high rocky ground. Farther northward are the large red barracks of San Benigno.

Signal station.—There is a semaphore, 305 feet above high water, on the roof of the upper barrack of San Benigno, painted black and white in chequers. The station is open day and night.

Lights.—A fixed green light is shown from the shore at Pra; occasionally a fixed white electric light is shown near the green light.

A fixed red light, elevated 23 feet, and visible 2 miles is shown from an iron standard, 13 feet high, on the shore eastward of a castellated building at Pegli. (See Light List.)

Genoa.—The renowned city of Genoa, "Genova La Superba" of the Italians, stands at the termination of that part of the coast at the head of the gulf called western Riviera; it is sheltered by a steep range of hills at the foot of the Apennines, which surround the semi-circular bay, upon the eastern side of which the greater portion of the city is built.

The city is defended by three lines of fortifications, the outer forming a semicircle 7 miles in circumference, supported by numerous detached forts, redoubts, and earthworks, crowning the summits of the hills which command the town.

The streets are steep, irregular, and narrow in the old part of the town, which however contains many fine buildings and even marble palaces. In the new quarter of Carignano there are now wide streets with fine building areas, and the so-called "Fronti Passe" or town walls, on the eastern side of the town are being rapidly pulled down and the eastern railroad station (Orientale) is now open. The principal public edifices are the ducal palace, cathedral, university, royal college, and naval school; there are also many convents, charitable institutions, about 50 churches and chapels (within the walls), also

an exchange, theater, botanic and other gardens. As much and varied color is used in the decoration of the palaces, the city and suburbs form a magnificent panorama when viewed from seaward.

The city lies between the rivers or mountain torrents of Polcevera on the west and Bisagno on the east, the former being crossed near its mouth by a bridge. An excellent supply of water is brought to the city partly by an aqueduct from the Bisagno Stream amongst the hills, which is 25 miles in length: and partly by an aqueduct from the Scrivia on the northern side of the Apennines, through the railroad tunnel of Giovi.

Genoa was with few interruptions the capital of a commercial republic until the eighteenth century; it was taken by the French in 1797, and ceded to the King of Sardinia in 1819. The population is about 265,082. The industrial enterprises are shipbuilding, iron-works, the manufacture of cotton, vermicelli and tanneries; in the district are copper mines, slate quarries, and mines of lignite coal.

Consul.—The United States is represented by a consul general, consul, and vice consul.

The port.—St. Giacoma Point is 1.4 miles 104° from Cape San Benigno, and between them is the bay of Genoa which extends about 1,600 yards in a northeast direction.

The port is formed by the inclosure of the bay within two moles; that on the western side having three arms. The first arm or Nuovo Molo extends from the western point of the bay, just northward of Cape del Faro (San Benigno), in a southeastward direction for a little more than $\frac{1}{2}$ mile. The second arm commences about 150 yards westward of the head of the first, and extends southward for about 700 yards, then turns off southeastward nearly parallel to the first for about 900 yards, forming the third arm, and called the Duca di Galliera Mole.

Giano Mole on the eastern side of the bay, 600 yards northwestward of St. Giacoma Point, projects southwestward for more than 600 yards.

Between Duca di Galliera Mole and Giano Mole is the entrance to the port, the mole heads being nearly north and south of each other, over 600 yards apart, with depths of from 9 to 11 fathoms, and forming within an extensive and commodious harbor. The harbor is easy of access in all weather for steamers.

The harbor master's office and petroleum stores are near the inner end of Nuovo Mole, the outer half of which has from 6 to 8 fathoms on either side of it.

Point St. Giacoma on the eastward has a battery and light tower on it; the 5-fathom curve is from 500 yards from the shore southward of the point to 200 yards at the north near Giano Mole.

The Vecchio Mole extends a short distance off Malapaga Point in a northwestern direction, then westward for 400 yards, terminating in an arm to the northwestward, the whole being 1,900 feet long. This divides the harbor into two parts, the outer called the Port Vittorio Emanuele.

Sea walls surround the bay, from which project upon each side a series of quays or jetties, with hydraulic cranes and railroad connection, and within are warehouses, etc. Other quays are in contemplation at Malapaga Point, and extending along the southern side of Vecchio Mole. There is a basin at the head of the bay, with the marine arsenal adjoining. The customhouse on Ponte Frederico Guglielmo, and the health office at the Ponte Salumi, close to the mouth of the arsenal basin. The lazaretto is on the eastern extremity of the Nuova Mole. The petroleum stores are near the inner end of Nuova Mole. The naval timber yard is on the coast eastward of the port a little beyond the Bisagno River.

The entrance to the inner part of the port between the Vecchio Mole and Pietro Paleocapa Quay, which projects northeastward from the eastern extremity of the Nuova Mole, is about 400 yards wide carrying a depth of from 5 to 7 fathoms; inside the Vecchio Mole there are from 3 to 5 fathoms, sand and mud. On the eastern side of the outer harbor the water is shallow.

A new basin is in course of construction, which will be formed by the prolongation of Duca di Galliera Mole in a west-northwestward direction from the point where it forms the outer elbow, and will have an area of about 96 acres with an internal available quay space of about 1,476 yards, and a depth of not less than about 39 feet. It will have an eastern entrance through the mole, immediately northward of the elbow, and a western entrance southward of Cape del Faro (San Benigno), each being 328 feet in width. The quays and adjacent railroad stations are lighted electrically.

Some blocks of stone, with about 6 feet water over them, are said to exist in the inner angle of Duca di Galliera Mole, which may be dangerous to torpedo boats coaling or watering there.

An extension of Duca di Galliera Mole in a southeastward direction, for a distance of about 200 yards, is in progress, the works being marked by spar buoys and two mooring buoys.

At the southward of the Vecchio Mole, a new quay and jetties have been constructed for the discharge of general cargoes, and a warehouse has been built for the deposit of goods. One new steam and two hydraulic cranes have been erected. The pier Sapri has been destroyed.

Harbor works (1916).—The department of public works has approved the plan submitted by the Genoa Harbor Board for the following extensions to the port of Genoa: (1) West as far as Polcevera, covering the proposed extension of the great shipbuilding plant of Ansaldo. (2) The extension of the Galliera, or outer mole, by 656 feet. (3) The construction of two small moles for insuring quieter waters in the port.

Of these improvements, the first only is of great importance. This further extension beyond the Basin Victor Emanuel III (now under construction) comprises the creation of a system of smaller connecting basins, of an active commercial zone, another possible free port, and large construction yards. The water surface, absolutely calm, thus added is more than 247 acres. This new territory may be utilized as soon as the outer defense wall is completed. The new construction will require eight years. By this extension the possible amount of traffic easily handled yearly in the port of Genoa will be increased.

Plans are under consideration for the building of a large maritime station for trans-Atlantic liners and passenger service.

Lightbuoy.—A cylindrical lightbuoy, exhibiting an occulting red light, is moored 320 yards 116° , from the lighthouse on the outer end of the Duca di Galliera Mole, and marks the outer end of the works in progress for the extension of that mole. Vessels should pass eastward of the buoy.

Buoys.—About 400 yards west-northwestward from the angle of Molo Duca di Galliera are four mooring buoys, and other red barrel-shaped buoys, placed in pairs, are moored along the line of the mole construction for the new basin.

Two mooring buoys are placed about 50 feet off the head of Molo Duca di Galliera, and will be moved as the work of extension progresses.

There are several mooring buoys in the port, belonging mostly to the steamship companies. A buoy at which vessels can swing to adjust compasses is moored about 400 yards southeastward of the head of Molo Giano.

Hospitals.—Chiapella military hospital has 300 beds; Pammattone hospital has 900 beds, and receives foreigners at a charge; Galliera hospital has 300 beds for natives and an annex for patients of any nationality, with separate rooms on payment in advance.

Disinfecting station.—There is a disinfecting station on Pointe Pietro Paleocapa in the large premises of the Lazaretto.

Communication.—Genoa is connected by rail with Nice to the westward, Chiavari to the eastward, and the lines to the interior.

Steamers run to all the Italian ports, Marseille, Barcelona, English ports, Egypt, Tunis, India, China, Japan, Australia, and North and South America.

The telegraph office is always open; there is telephonic communication with the suburbs, Voltri, and Rome.

Radio.—A radio station, established at Castellaccio Fort, Genoa, gives service day and night: call letters I C B.

Vessels fitted with radio approaching Genoa are requested to communicate the time of their probable arrival to this station in order that arrangements may be made for their berthing.

Trade.—The principal imports are oils, wheat, rice, sugar, coffee, tobacco, coal, dried fish, cotton, iron, hides, machinery, manures, timber, silk, seeds, etc.; the exports, wine, oil, vermicelli, silk, cotton yarns, rice, cheese, fruits, hats, hides, paper, stationery, spirits, woolen goods, matches, coral, and marble.

Lights—San Benigno.—A flashing white light, elevated 384 feet above the sea, and visible 27 miles, is exhibited from a yellow square tower over dwelling, 249 feet high, situated on the inner part of the battery on Capo del Fargo (San Benigno). The eclipses are not total within 15 miles. (For arc of visibility see Light List.) From a semaphore northward of the lighthouse, signals are made on the approach of vessels. (See Light List.)

Duca di Galliera Mole.—An occulting red electric light, elevated 72 feet above the sea, and visible 14 miles, is exhibited from a red iron framework pyramid, with gallery and lantern, situated at the extremity of Duca di Galliera Mole. (See Light List.)

Giano Mole.—An occulting green light elevated 26 feet above the sea, and visible 8 miles, is exhibited from a gray iron structure on the head of Giano Mole. It is not seen by vessels in the offing when westward of an extended line drawn from the light to Duca di Galliera Molehead. (For arc of obscuration, see Light List and Chart.)

Pietro Paleocapa Mole.—From a small brick tower on the northeastern angle of Pietro Paleocapa Mole is exhibited at an elevation of 28 feet above the sea, an alternately red and white light visible 5 miles; the light is seen from the entrance of and within the port, but is obscured through the arc comprised between Duca di Galliera Mole and San Benigno Lights. (See Light List.)

Vecchio Mole.—An alternating white and green light, elevated 28 feet above the sea, and visible 5 miles, is exhibited from a masonry tower on the southwestern corner of the head of the Vecchio Mole.

Also from a white truncated conical tower 59 feet high on corner of Stella Battery, St. Giacomo Point (eastern side of the entrance to the port), is exhibited at an elevation of 92 feet above the sea, a fixed and flashing white light visible 12 miles. (See Light List.)

Time signal.—The following time signal is made from the semaphore station on Cape San Benigno by means of a flash light signal consisting of a group of 8 flashes of 1,000 candlepower each, visible about $4\frac{1}{2}$ miles.

The flashes will begin at 22h., 0h. and 3h. and will cease at 22h. 05m., 0h. 05m. and 3h. 05m. mean Central European time, corresponding to 21h., 23h. and 2h. and 21h. 05m., 23h. 05m. and 2h. 05m. Greenwich Mean Time, respectively.

On festival days the signal is made once only, at noon, standard mean time.

At Fort Castellaccio, a gun is fired electrically from the Hydrographic Office, at noon, standard mean time. Should the signal fail, the gun will be fired at 1h. 0m. 0s., standard mean time.

Chronometers.—A chronometer regulated daily by electricity is kept in the office of the Nautical Intelligence of the Consorzio Autonomo, Palazzo San Giorgio, for the convenience of officers of vessels wishing to compare, which they may do between the hours of 9 a. m. and 6 p. m.

NOTE.—See note on page 50 regarding summer time.

Anchorages.—Large vessels sometimes anchor outside the harbor in from 15 to 20 fathoms water, but it is not recommended to do so; the general anchorage for such vessels is in Avamporto Victor Emanuel or Porto Nuovo. Vessels moored in the latter anchorage, stern on to the Nuovo Mole, should have two anchors down (north-northwest and north-northeast) with 80 or 90 fathoms of chain out on each and the stern about 80 yards from the mole, to which four hawsers should be laid out, two of them hemp; the squalls from north-northeast in January are heavy. In case of an unseasonable gale this position is very insecure.

There are 13 berths available for large vessels on the inner side of the Duca di Galliera Mole, marked by large numerals about 10 feet high; there is a bollard at each berth and one between. Foreign naval vessels are berthed here. Vessels let go an anchor and haul the stern into the bollard selected. Southerly winds formerly sent in a considerable swell, but since the completion of the outer moles vessels are able to lie at their berths in the worst of weather and discharge cargo.

The berths to be taken by vessels are determined by the captain of the port, and they are divided into zones, according to the cargoes.

The Calate of Molo Nuovo, Passo Nuovo, and San Benigno, or those from Ponte Paleocapa to Ponte Biagio Assereto inclusive, are reserved for vessels with coal, except Ponte Caracciolo, which is used for vessels with salt, petroleum, timber, and old iron. Ponte Cristoforo Colombo is used by vessels with cotton.

Ponte Andrea Doria is used by vessels shipping goods for export, and also by local steam vessels.

Steamers bound to America with emigrants lie between Calate Zingari and Santa Limbania, and go alongside Ponte Federico Guglielmo to land or embark passengers.

Ponte Adolfo Parodi is used by vessels with cereals, and Ponte Francesco Morosini by vessels with wine.

Molo Duca di Galliera is reserved for naval vessels, and also for vessels in quarantine, as well as steamers in ballast about to sail, to stop temporarily. There are 13 berths for large vessels on the inner side of the mole, marked by large numerals; there is a bollard at each berth and one between. Vessels let go an anchor and haul the stern to the bollard selected.

Molo Giano is used for vessels with infectious disease on board, or with inflammable materials.

The mole extending 400 yards northwestward from near the middle of Molo Giano, and eastward of which are the dry docks, is used for vessels under repair or refitting, and pleasure steamers.

Pilots.—The pilot boats fly at the masthead a blue, white, blue vertically striped flag, with P in blue on the white stripe.

It may be of use to naval vessels visiting Genoa to know that pilots (whose services are not really required) are fond of coming off to place vessels inside the mole as though coming from the captain of the port. All that is wanted is a direction from the port department where to place the vessel, therefore it is as well to wait outside till an undoubted official comes off.

Measured distance.—A distance of 6,264 feet has been measured outside the port for testing the speed of vessels. The western limit is the central pillar of Polverina Granaralo in line with Cape Faro Lighthouse, and the eastern limit is Torre Embriaci in line with a telemetrical mark on the head of Molo Duca di Galliera; the running course is 111° and 291° .

Navigation—Caution.—The Italian regulations for navigation in the port of Genoa are that steamers are to keep to that side of the fairway or mid-channel which lies on the port side of such vessel. This is contrary to article 25 of the International Regulations for preventing collisions at sea.

Directions.—When approaching the port of Genoa the chain of the Apennines, covered with snow, is first sighted, and then Monte Antola, 5,243 feet high, which lies 13 miles northeastward of the port, Cape de Faro Lighthouse, and the town. The heads of the moles should be given a sufficient berth. The current generally sets westward. At night, especially with strong northerly winds, it is not prudent to enter the port; vessels then can anchor in the Avamporto.

The speed of vessels in the port is not to exceed 5 knots.

Steamers approaching the port, when within 2 miles of Molo Duca di Galliera Lighthouse, should keep Cape del Faro Lighthouse in range with Molo Duca di Galliera Lighthouse, and not go to the northward of this range till near the light buoy, and those leaving the port should keep northward of the range, observing that the 5-fathom curve off the mouth of Torrente Bisagno is about 500 yards offshore.

Steamers entering steer from 100 yards eastward of the light-buoy marking the extremity of the works in progress for extending Molo Duca di Galliera, direct, to leave Ponte Pietro Paleocapa about 100 yards on the port hand, and those leaving steer from about 100 yards off the head of Molo Vecchio, direct, to leave the head of Molo Giano about 100 yards on the port hand.

The space in the harbor available for navigation is very limited, and some vessels, secured alongside the quays, project beyond them. These vessels are moored with their sterns to the heads of the moles, while there are frequently other vessels inside the line of the moles, the stern of each outside vessel being secured to the cables of the vessel next inside.

Gunfire for practice is sometimes carried on from Forte di San Benigno, Forte Angeli, Forte Vagno, and Forte San Giuliano, at which time the danger zone extends about 4 miles seaward.

Port regulations.—The following regulations are selected from the port by-laws:—

From November 1 to March 31 vessels within the port must moor with two anchors, and from April 1 to October 31 one anchor only is required.

Vessels loading or unloading cotton, jute, and other inflammable cargo must have their boiler and galley funnels covered with a metal net, the meshes of which are not larger than those of one on view at the port office at Ponte Morosoni; on board such vessels lighting fires and smoking are strictly prohibited.

Vessels with petroleum, tar, benzine, naphtha, and other inflammables on board are to anchor, on their arrival, in the Avamporto, where, subject to the permission of the captain of the port, they may discharge their cargoes, provided that not more than 100 cans of 100 liters (22 gallons) each are landed at a time. In other cases they must go through the necessary forms at the office of the captain of the port, in order to obtain permission for going alongside Calata Passo Nuovo.

Petroleum tank vessels and other vessels with inflammables on board before going to the berth assigned to them must put out all fires, and make arrangements for their safe and rapid discharge: such vessel must fly a red flag at the main masthead.

Winds.—The port is well sheltered, and only during the bad weather of the sirocco is there any swell, which sometimes prevents work from being carried out at the Calate and ponti. Northerly winds are troublesome, especially in winter, when heavy squalls descend from the mountain gullies, accompanied at times by rain and snow. The libeccio (southwest wind) rarely blows with violence at the head of the gulf, but sometimes it is extremely violent; in November, 1898, it caused great damage to the mole.

Northerly winds, especially in winter, are strong in the port, and attain their greatest force at 1 or 2 miles from the coast, causing a rough sea. With southerly winds, and in some cases with the sirocco, the water in the port rises above its ordinary level. This indicates bad weather outside, and it frequently happens that while the sirocco is blowing strongly off Portofino, or the libeccio off Cape delle Mele, there are calms or northerly winds at Genoa, accompanied by a low barometer.

The summit of Monte di Portofino covered with cloud indicates the probability of southerly winds; the summit uncovered and clear indicates fine weather and northerly winds, even if the appearance is dark and threatening to the northward of Genoa. When the summits of the mountains of Voltri and Genoa are covered with clouds, forming thick strata, northerly winds, possibly strong, are likely to set in after a short interval. Local mariners call this form of cloud "garo."

Currents.—Outside the port the current generally sets westward, and its rate increases with the sirocco. It is felt a little in the Avamporto, but usually there is no current in the port excepting a slight outward set. The current may be reversed by westerly winds.

Climate.—According to observations made during a period of 60 years, the mean annual temperature at Genoa is 60.4° ; the mean monthly temperature in January, the coldest month, is 45.5° ; and in July and August, the two warmest months, 76.2° . The mean annual height of the barometer is 29.98; the highest mean monthly reading, January, is 30.7; and the lowest, April, 29.87. According to observations made during 10 years, north and northeast winds blow during 154 days in the year, east and southeast winds 79 days, and south and southwest winds 76 days. Owing to the prevalence of the Tramontana or northerly winds in winter, Genoa is then bitterly cold. The average annual rainfall is 51.3 inches; rain falls all the year round, but least in July and August. For robust people the climate is healthful, but it is not suitable for those having chest complaints.

The following table gives the average number of days in each month the wind has prevailed from the several directions.

These are the results of observations made during 10 years.

Supplies.—Provisions are plentiful. Water can be procured from the contractor, the Nicolay Water Co. Drinking water is laid on all along the quays; there are two fire brigade stations and a tug provided with powerful steam pumps.

Coal.—About 75,000 tons of coal are kept in stock; 2,000 kept ready in lighters. Coaling is done by lighters, and 400 to 500 tons can be loaded per working day.

Repairs.—The works of Ansaldo & Co. are at Sampierdarena, to the westward of the port; here there is every requisite for making and repairing the largest engines and boilers. There is a steam hammer of 40 tons and several smaller, also means of casting a weight of 40 tons. Vessels of 5,250 tons have been built, but this department is now at Cornigliano and Sestri di Ponente. There is no wharfage at either place, but a floating crane to lift 120 tons is under construction for use at both works. This firm has opened a large engineering workshop at Genoa to facilitate repairs to steamers, either of hulls or engines. Messrs. Odero & Co. build vessels of 4,000 tons, torpedo boats and marine engines, also various other work; their establishments are at Sestri di Ponente and Foce. There are many other smaller firms.

Docks.—There are two dry docks northward of the inner part of Molo Giano, and one eastward of the entrance to the Darsena; a floating dock is moored northward of Molo Vecchio. For particulars see Appendix I.

Port officers.—The headquarters of the captain of the port are in the large customhouse building, situated within and between Ponti Federico Guglielmo and Adolfo Parodi. There is a port office, especially for technical matters and for granting pratique to vessels, on Ponte Francesco Morosini, and two others on Ponte Federico Guglielmo and Calato Passo Nuovo, respectively.

Tugs frequently go out to sailing vessels without waiting for a signal, and there are also tugs in the port to assist vessels in mooring. An agreement should be made as to the charge before engaging one.

Landing is permitted anywhere if without baggage. The best places are at Ponte Andrea Doria and Ponte Federico Guglielmo, where passengers are landed.

Adjustment of compasses.—Vessels adjusting compasses at the buoy southeastward of the head of Molo Giano should swing by aid of a tug. Portofino semaphore is the best object for the true bearing.

The coast towns.—From the eastern mole of Genoa the coast runs nearly southeastward for 10 miles, as far as the town of Recco, where it abruptly turns southward $2\frac{1}{2}$ miles to Chiappa Point; a few scattered rocks lie within 300 yards of the shore, otherwise the coast is hold-to and high. Half a mile eastward of Bisagno Stream is

an old tower and battery, a short distance beyond which is the fort of San Giuliano; on the hill over the latter is Fort San Martino. Nervi and Recco (ancient Ricino), distant, respectively, 4 and 8½ miles from the river, are the principal towns on the coast. Between these towns is a tower near the entrance to Sori River.

The village on the northwestern side of the port is much frequented in winter; there is a large hotel and several villas.

Supplies.—Provisions can be obtained from Santa Margherita, and water from a hydrant on the north quay, alongside which is a depth of 6 feet with 12 feet a little off it.

Tunny fishery.—Tunny nets extend in a west-northwest direction 550 yards from the shore, northward of Chiappa Point.

Portofino Harbor.—From Chiappa Point a high, bold, but broken coast, extends to Portofino Point, the western entrance of Rapallo Bay. Close round northward of the point is a small indentation called Portofino (ancient Portus Delphini); it extends nearly 600 yards in a southwesterly direction, having a sandy beach at the head. The entrance is 300 yards wide and within the northern point is a cove where water can be procured. There is a depth of 20 fathoms at the mouth of the bay and from 4 to 2 fathoms off the town; although open to the northeast there is never a heavy sea here. Portofino Harbor forms a good and sheltered anchorage for vessels of moderate draft; they can let go an anchor in the entrance and make fast astern to the shore, where there are several old guns used as bollards. The water is deep on each side, and 3 fathoms will be found within about 50 yards of the bollards. The harbor is used by yachts and small fishing craft, and is perfectly sheltered from all winds. The town is at the head of the bay on the northern side.

Lights.—A flashing white light, elevated 131 feet above the sea and visible 16 miles, is exhibited from a yellow turret and dwelling, 42 feet in height to center of lantern, situated on the extremity of Portofino Point, at a distance of 300 yards 127° from the fort on 328-foot summit. (For arc of obscuration, see Light List.)

From the southeastern corner of the health office, on the northern side of the entrance, a fixed green light is exhibited from an iron support at an elevation of 26 feet above the sea, visible 6 miles.

From an iron post on Isolotto Rock, at an elevation of 13 feet above the sea, a fixed red light is exhibited, visible 3 miles.

There is also a small fixed light exhibited from the extremity of the stone jetty at the head of the port, elevated 20 feet, and visible 6 miles. (See Light List.)

This light is not easily distinguished from the town lights.

Buoy.—A mooring buoy lies in the entrance to the port.

Porto di Camogli, nearly 1 mile southeastward of Torrente Recco, is small and sheltered by a mole about 200 yards in length, but a dangerous swell sets in with the libeccio. In 1907, the head of the mole was destroyed by the sea, and the materials encumber the entrance to the port.

Punta della Chiappa juts out about 200 yards westward from the southwest extremity of Promontorio di Portofino, and its extremity appears like a low, bare, and blackish mole.

A white pillar stands near the root of the point, and a pillar, slightly pyramidal and painted black and white in chequers, stands on the middle of the point; the latter is a mark for a measured distance.

Monte Portofino, the summit of the promontory, is 2,001 feet high, and is marked by the old semaphore and the new semaphore and old forts on the lower summits.

The coast from Punta della Chiappa trends east-southeastward $3\frac{1}{2}$ miles to Punta di Portofino; it is steep-to. The Torretta, a square tower, stands 338 feet above high water, on a point about 1 mile southeastward of Punta della Chiappa.

Signal station.—A semaphore, the house being chequered black and white, is situated on Monte Tocco, 1,449 feet above high water, in the southwestern part of the promontory.

Measured distance.—A distance of 19,810 feet has been measured southward of Promontorio di Portofino. The running mark is Torre Sestri (Sestri Levante) in line with Casa Macalle, 96'; the beacon on Monte San Nicolao, which is southward of the line, is a good mark for finding Casa Macalle. The western limit is the beacon on Punta della Chiappa in range with the western side of Casa ex Raggio; the eastern limit is the beacon on Punta di Portofino in range with Villa Spinola at Santa Margherita.

Porto Paraggi, a similar bight to that of Portofino, but shallower at the head, extends in a northwest direction from Cajeca Point. The village of Paraggi is on a sandy beach, at its head, and on the northern entrance point is a tower and battery. Northward of these are a convent and guardhouses, and about 1 mile farther the small port of Sta. Margharita.

Sta. Margharita.—Two miles northward of Portofino is a bay with a sandy beach, broken in the center by a projecting rocky point, from which extends a short mole forming the fishing port of Sta. Margharita, the principal coral fishing establishment of the district, containing a population of about 7,000. The mole extends out to a depth of 30 feet, but it is shallow inside; small vessels lie moored with sterns fast to the shore in 16 feet water. There is very good anchorage in 10 fathoms, 400 yards off the pierhead, more sheltered

than off Rapallo, especially in the winter months. On the southern point of the bay is a tower, and on the northern, Fort Pagana, a short distance beyond which is the village and church of San. Michele.

Light.—An occulting red light is exhibited from an iron truss on a small masonry foundation on the head of the mole. Vessels should give the light a berth of at least 40 yards. (For arc of visibility, see Light List.)

Rapallo, a town situated about $\frac{3}{4}$ mile northward of Punta Pagana, extends along the north shore of a cove. Rio Bogo flows into the cove on the western side of the town, and Torrente San Francesco, through the eastern part. Monte Garavagli, $2\frac{1}{2}$ miles northwestward of the town, is surmounted by a sanctuary, 2,011 feet above high water; the church in the town has a remarkable yellow and reddish campanile, and near the bridge over Torrente San Francesco a massive fort rises from the sea; it is of elliptical section, dark in color, furnished with windows, and surmounted by a square turret. The town is a favorite winter resort; the principal industry is lace-making; vegetables and fruit are produced. There is communication by railway and telegraph. The population was 11,486 in 1913.

The cove is 800 yards in extent with depths of from 2 to $2\frac{1}{2}$ fathoms in the middle; it is well sheltered except from southerly winds. A mole, about 65 yards long, extends northeastward from the western point of the cove; the space northward of it is available only for boats owing to the small depths. A similar mole extends off the southern entrance point to Rio Bogo; both moles have from 2 to 10 feet water alongside; a little southward of the last-mentioned mole is a small wooden pier with 4 feet water at its head. Rocky and foul ground extends 200 yards off the eastern shore, eastward of the southern mole.

Anchorage off Rapallo is much exposed and consequently little frequented.

Chiavari.—From Rapallo the coast trends southeastward to Cape Sestri. Chiavari, a considerable town situated on the coast about half way, is inclosed by cultivated hills; on the eastern side of the town is the Lavagna or Entella River, one of the chief streams in the Gulf of Genoa. Chiavari contains several churches, a hospital, a convent, and lace and silk-twist manufactories; marble and slate are quarried in the neighborhood and there is an anchovy fishery. Ship-building is also carried on. The population is about 12,500.

Anchorage may be had anywhere off the beach, which is steep-to, there being a depth of $3\frac{1}{2}$ fathoms within 20 yards of the shore. The holding ground is good.

Lavagna.—The Lavagna River runs in nearly straight about northeast for 3 miles, then winds round in a northwestern direction

behind a ridge of hills which branch from the Apennines down to the promontory behind Portofino; $\frac{1}{2}$ mile eastward of it is the village of Lavagna, which has a fine church and a marble palace, and is also noted for its slate quarries. Mount Enchetta (1,804 feet in height) is $1\frac{1}{2}$ miles from the coast, half way from Chiavari and Rapallo.

Measured distances.—A distance of 9,721 feet has been measured off Chiavari; the running course is a whitish cylindrical tower on the steep part of Punta Manara in range with a similar tower on Punta Baffe, bearing 111° ; a distance of 9,683 feet has also been measured, the running course being Torre Villa Odero, on Punta Cajeca, in range with the white cylindrical tower near Campo, bearing 292° . The western limit for both distances is the campanile of Bacezza church in range with the campanile of San Bartolomeo church, and the eastern limit is the chimney of the cotton factory at Entella in range with the campanile of Breccanecca church. The depth on the courses is 37 fathoms.

These courses are only to be used by vessels with a displacement of 1,500 tons up to a speed of 26 knots; 3,000 tons to 25 knots; 5,000 tons to 24 knots; 10,000 tons to 20 knots; and 15,000 tons to 15 knots.

The coast southeastward of Lavagna is backed by steep slopes, which are thickly wooded in places; it is clear at a moderate distance, the 5-fathom curve being about 800 yards off it.

Cavi is a small group of houses built around a church with a cupola, situated near the sea $1\frac{1}{4}$ miles from Lavagna.

Sestri Levante.—The coast eastward of Lavagna is backed by steep slopes, which in some places are thickly wooded; the shores are clear of danger at a prudent distance, there being from 6 to 10 fathoms within $\frac{1}{2}$ mile of the shore. Sestri Levante stands partly on the rocky headland of Cape Sestri and partly on the sandy peninsula connecting it to the main; it is defended by a castle and rampart on the headland, and contains a population of about 2,700; in the bay, on the northern side of Cape Sestri, is the entrance of the Petronio River, and on the shore are a tower, scattered houses and several wells. A small rocky point lies about $\frac{1}{4}$ mile northward of Sestri Head, 400 yards off which is a rocky shoal with 15 feet over it, and 18 feet between it and the shore; round Cape Sestri the water is deep close in, but the bay is shallow 400 yards from the shore, the 5-fathom curve being $\frac{1}{4}$ mile off. A mooring buoy, painted white, in 17 feet of water lies in the north bay of Sestri Levante.

The Port of Sestri is a narrow inlet on the southern side of the peninsula; it is open to the south, and only adapted for small vessels. When entering keep toward the eastern shore to clear a rocky point, round north of which the above class of vessels lie in security.

A breakwater is in course of construction; it extends 200 yards 332° from Sestri Point, the extremity being submerged.

Light.—A fixed green electric light, elevated 39 feet above the sea, visible 4 miles, is established on an iron column 23 feet high, painted red, erected about 50 yards from the submerged extremity of the breakwater.

Vessels should give this light a berth of 100 yards in passing. (See Light List.)

Manara Point, 1 mile southward of Sestri, is a bold cliffy headland on which are a guard tower and old telegraph; from the latter the slope toward Sestri is thickly wooded.

Baffe Point, about 2 miles southeastward of Manara, is a remarkable and rather salient headland rising abruptly from the sea to the height of 827 feet, with a whitish tower, a measured distant mark, on it; between these points is Dentone Bay, with deep water close in. On the beach at the head of the bay is Riva Pontente and Riva Levante villages.

The coast.—From Baffe Point the coast, forming several bays, open to the southward and southwestward, trends southeastward 10 miles to the high projecting point of Mesco. A steep range of hills descends in a southeastern direction from the Apennine Range, one of the peaks of which (Mount San Nicolao) half way between Manara and Mesco Points, is elevated 2,781 feet. There are several villages both on the shore and on steep slope within.

Moneglia, a small town containing a church with a conspicuously tall steeple, stands at the head of a bay 2 miles from Baffe Point; with the exception of a few rocks a short distance off the points, the bay is clear of danger, and the land rises immediately over the eastern side to a height of 1,436 feet; on this summit is a conspicuous white building.

Anchorage in 4 fathoms sheltered from westerly winds may be had on the western side of the point at the head of the bay, with the church bearing about 79°.

Deiva village lies at the mouth of the valley, situated about 2 miles southeastward of Moneglia, and through which Torrente Deiva flows to the sea.

Fortified coast.—The coast between Torrente Deiva and Fiume Frigido, about 13 miles southeastward of Spezia, is considered fortified. See Regulations.

Bonassola Village lies at the head of a small cove eastward of Punta di Monte Grosso, which is situated $4\frac{1}{2}$ miles from Moneglia.

Levanto, a small town, lies about $1\frac{1}{2}$ miles eastward of Bonassola, on the eastern shore of a bay. The population is about 5,000. The small chapel of Madonna della Neve, with no campanile, is situated, 208 feet above high water, a little inland from the west side of the bay; Casa Olivieri, a conspicuous white house with a square tower, lies a little farther southeastward; a railroad bridge with three

arches and a cylindrical red and yellow tank are conspicuous, while immediately southeastward is the railroad station, which is noticeable. Campanile di Legnaro, 604 feet above high water and reddish in color, lies northeastward of Levante.

Secca della Peria, a rock with about 3 feet water, and from 7 to 10 fathoms around, lies 400 yards off the northwestern shore of the bay. The passage inside the rock is navigable.

Clearing marks.—Casa Olivieri in range with Campanile di Legnaro leads northward, and the railroad station well open southward of Campanile di Legnaro leads southward, of the rock.

Anchorage.—There is anchorage anywhere in the bay, avoiding Secca della Peria; the $2\frac{1}{2}$ -fathom curve is not more than 200 yards offshore, and the 5-fathom curve about 500 yards.

Mesco Point is bold, steep-to, and faced by high cliffs, the land immediately over it (Mount Ve) attains an elevation of 1,621 feet. On the point are the ruins of San Antonio Convent, elevated 1,020 feet. There is a small islet or rock close off the western side of the point, which is steep-to. About $\frac{1}{2}$ mile off the point there are 30 fathoms.

Semaphore.—There is a semaphore telegraph station on Mesco Point.

The coast—Villages.—From Mesco Point a high, steep, and rocky coast trends to the southeastward to Porto Venere, a distance of 10 miles, and is steep-to the whole distance. Several villages are scattered along the shores and wooded slopes, the principal of which are Monterosso, Vernazza, Corniglia, and Riomaggiori; the latter is near Negro Point, 5 miles from Mesco. Above Negro Point is a conspicuous white rectangular building, in the center of which is a high tower with cupola; at the eastern end of the building are cloisters, and the whole has the appearance of a monastery.

Ferale Rock or Islet lies about 200 yards from the shore, $2\frac{1}{2}$ miles southeastward of Negro Point; the channel between it and the shore is full of rocks. A steep coast with high cliffs continues southward for 3 miles to Porto Venere, Mount Castellana (about halfway) immediately over it rising to an elevation of 1,673 feet.

Porto Venere (ancient Portus Veneris), a town partly walled and fortified and containing a population of 4,500, stands on the extreme southwest point of the main land forming the western shore of the Gulf of Spezia. The western side of the point, San Pietro, is high and cliffy, composed of black and yellow marble, and the steep slopes of Mount Muzzrone, the highest land immediately over the shore, are covered with olive trees close down to the water. There is a small bay on the western side of the point; it is about 200 yards wide and the water is deep, the coast being clear of danger at 200

yards' distance. A reef, on which is 13 feet, extends 100 yards southward from the extreme point.

A mole extends about 65 yards from the middle of the village, and a wide paved mole, furnished with steps, extends about 30 yards off the shore southwestward of the hospital.

The hospital is a large square yellow building close northeastward of the village.

Fortified ports.—Levanto, Monterosso, and Porto Venere are considered to be fortified towns.

Little Passage, between this point and Palmaria Island, is about 100 yards wide in its narrowest part. It is, however, only navigable to very small vessels, there being a shoal connecting the island with the main. The shoal is about 400 yards in breadth and has a least depth of 9 feet over a bottom of weed. The passage is crossed by a telegraph wire overhead.

Light.—A fixed red light is shown, at an elevation of 21 feet, from an iron trellis mast painted gray with a red top near the end of the jetty. (See Light List.)

Range beacons.—There are two masonry pyramidal beacons, each 20 feet high, on Punta della Castagna; the southwestern (front) one is white, and the other (rear) black and white in horizontal stripes. The beacons in range 48° lead through the middle of Little Passage.

Palmaria Island is triangular in form, with an irregular outline having nearly equal sides about 1 mile in extent; the summit, which is nearly in the center, has a steep fall toward the south; on it are an old watchtower, semaphore tower, and a fort; the slopes are covered with olive trees, and the island has been long famed for its black marble with golden veins.

The western side of the island has deep water close along the foot of the cliffs. Off the northeastern point of the island is the small islet of Scuola, on which is a ruined tower; shallow water surrounds it for a short distance, and in the passage between it and Palmaria there are 6 fathoms; 350 yards northward of Scuola is a shoal of $5\frac{1}{2}$ fathoms with 7 and 8 fathoms close around it.

On the north of the island is Terrizzo Bay, where there are a few cottages.

Prohibited anchorage—Caution.—Owing to submarine works in progress off the eastern side of Palmaria Island, between Scuola Point and Mariella Point, and extending 1,300 yards from the coast, all vessels entering or leaving the Gulf of Spezia should pass eastward of this area.

Radio.—There is a radio station on Palmaria Island. It is open to the public from sunrise to sunset; call letters, M P M.

Semaphore.—A semaphore has been established on this island; it is connected with Porto Venere by an electric telegraph wire across the passage at an elevation of 80 and 100 feet. The semaphore building is painted in black and white checkers.

There is a continuous service by day and at night. Vessels entering and leaving the gulf by day and at night should make their numbers to the station.

Buoys.—There are three conical buoys for the use of torpedo craft, moored to the westward of Scuola Point, and a square buoy is moored in Terrizzo Bay for the use of mail steamers.

Tino Islet, off the southern end of **Palmaria**, is separated from it by a passage $\frac{1}{4}$ mile wide, having 16 fathoms in mid-channel; the islet is 700 yards long in a northwest and southeast direction, irregular in outline, with steep cliffs on its western side; on its summit is a lighthouse, which is, however, not very conspicuous on account of the trees near it. The islet is covered with vegetation. **Tinetto Islet**, about 200 yards from the southern shore of Tino, is connected to it by a rocky spit; from Tinetto a ledge of rocks extends about 200 yards to the southward.

Light.—A group flashing white light, elevated 384 feet above the sea and visible 27 miles, is exhibited from a white circular tower, 80 feet high, with red dwelling attached, situated on the summit of Tino Islet. (See Light List.)

Beacon.—There is a stone pillar, 20 feet high, on the eastern slope of Isola del Tino; it is a mark for a measured distance.

The Gulf of Spezia (ancient *Portus Lunæ*) extends about 6 miles in a north-northwest direction; the entrance, between Tino Island on the west and Corvo Point on the east, is 5 miles wide. The coast on both sides is very irregular in outline, forming several coves affording excellent shelter. Except in the coves, and at the head of the gulf, where the shallows extend from 400 to 500 yards from the shore, there is a moderate and even depth of water throughout, gradually decreasing from 10 fathoms at the entrance, to 4 and 5 fathoms at the head; the west side is the deepest, and the bottom is mud. The head of the gulf is flat, marshy, and partly cultivated; the slopes of the surrounding hills are thickly wooded. The entrance to the gulf is guarded by numerous strong forts and batteries.

Caution with regard to submarine vessels.—Exercises with submarine vessels will be carried out daily in the vicinity of the Gulf of Spezia, principally in depths of over 15 fathoms, between Tino Island and Leghorn.

Submarine vessels, when submerged, will usually be escorted by a vessel which will carry a red square flag at the masthead.

A similar flag will be shown at Palmaria Island semaphore, which, when necessary, will be lowered to signal to vessels in sight.

Vessels observing the escorting vessel should pay attention to International Code signals which she may hoist; these signals, when urgent, may be accompanied by the firing of a gun.

A good lookout should be kept for the periscopes of submarines, which are usually surmounted by a pole about 2 feet high, on which a red triangular metal vane with a white number is shown.

Anchorage prohibited—Buoys.—Five pairs of buoys have been established in the Gulf of Spezia. The buoys are situated on either side of a line bearing 111° from Point Castagna. The first pair are 164 feet on either side of a point on the bearing 111° , 1.08 miles; the second 196 feet from a point 1.62 miles; the third 229 feet from a point 2.16 miles; the fourth 262 feet from a point 2.70 miles; and the fifth 295 feet from a point 3.24 miles from Cape Castagna.

Vessels are prohibited from anchoring even temporarily in the vicinity of these buoys.

Porto Venere Bay.—Between Castagna Point, the southeastern extremity of the western promontory of Spezia Gulf, and the northern coast of Palmaria Island, is the well-sheltered bay of Porto Venere, the before-mentioned shoal protecting the anchorage from a westerly swell. There are depths of 6 to 8 fathoms mud over the gulf. Merchant vessels are prohibited from anchoring in the outer part. See page 210.

Between Castagna Point and the head of Spezia Gulf are several small bays, all available as anchorages.

Jetty—Light.—A fixed red light, visible 6 miles, is erected on the head of the jetty recently (1913) constructed in this vicinity.

The light is shown 21 feet above the sea from an iron staff 11 feet high, the lower portion painted gray and the upper portion red, located 26 feet back from the head of the jetty. (See Light List.)

Castagna Bay, the most southern, has from 6 to 7 fathoms of water over an extent of about $\frac{1}{4}$ mile each way; on the northern point of entrance is Fort Santa Maria.

Varignano Bay, between Santa Maria Fort and Varignano Point, is only 300 yards wide at the entrance; it has over it an average depth of $5\frac{1}{2}$ fathoms, but shoals suddenly at 250 yards from its head. The lazaretto establishment is situated on the small peninsula between Varignano and Grazie Bays. Merchant vessels are prohibited from anchoring in either Castagna or Varignano Bays.

Grazie Bay, between Varignano Point and Pezzino Point, is 600 yards wide and $\frac{1}{2}$ mile deep; it is shallow 300 yards from its head, but affords an average depth of 6 fathoms over a muddy bottom; the bay is reserved for vessels under quarantine. On its northern point is Fort Pezzino or San Andrea, beyond which is Panigaglia Bay and the small cove of Cadimare.

Seno delle Grazie, between Punta del Varignano and Punta Pezzino, 700 yards northwestward, extends $\frac{1}{2}$ mile southwestward; it has depths of from 5 to 6 fathoms, but shoals 300 yards from its head; the bottom is mud. The bay, in which there are twelve mooring buoys, is reserved for vessels in quarantine.

Seno di Panigaglia, between Punta Pezzino, on which there is a fort, and Punta Fezzano, about $\frac{1}{2}$ mile west-northwestward, extends 500 yards southward, and the 3-fathom curve is about 200 yards from its head.

There are fifteen mooring buoys, and one post for adjusting compasses, in the bay.

Seno del Fezzano, between Punta Fezzano and Punta Cadimare, 500 yards northwestward, has a landing pier off Fezzano Village.

Cala di Cadimare, northwestward of the point, is small. A new basin is being constructed off Cadimare, and the extremity of a mole in progress, about 700 yards northeastward of Punta Cadimare, is marked by a light-buoy; passage is prohibited between the buoy and the western shore. White square buoys, each surmounted by a staff with a flag, mark the works in progress. The head of the new mole is above water.

Spezia or La Spezia, the principal naval port of Italy, is a well-built and improving town near the shore at the head of the gulf, containing a population of about 74,278 in 1913; it is the capital of a province, and in the last few years has undergone considerable embellishment. Eastward of the town is a citadel or castle, and a tower stands on the outer fall of a ridge over it; works on a large scale for the defense of town and port are being carried out.

There are several hospitals, barracks, and many fine buildings, parks, and gardens, with a network of military roads, spreading over the surrounding hills, in excellent condition.

Fortified port.—Spezia is a fortified port. See Regulations.

Storm signals are shown from a flagstaff near the harbor master's office.

Trade.—The principal industries are shipbuilding, manufacture of telegraph cables, patent fuel, etc.; there are marble and sandstone quarries and lead mines in the locality.

The chief imports are coal, manures, wood, old iron, steel plates, timber, grain, lead and lead ores, phosphates, mineral oils, coal tar for briquettes, and articles for the lead works of Pertusola, and the dockyard. The exports are wine, oil, lead, marble, timber, casks, and stone for paving and building. Local produce is principally carried by rail direct to other countries, or by coasters to Genoa and Leghorn for exportation.

Hospitals.—There is a naval hospital near the dockyard, with a branch at Porto Venere, Sant' Andrea civil hospital has 146 beds, and receives foreigners at a charge per day in the wards, and a charge for surgical and medical cases in separate rooms.

Communication.—There is railroad communication with Genoa, Lucca, Pisa, Florence, and Parma. The Government establishments on both sides of the gulf are connected by lines of railroad round the shore.

Dockyard.—The royal dockyard and arsenal occupy the north-western corner of the gulf. The whole is fronted by walls, with landing piers and jetties, and there are water basins, connected by a narrow passage, besides others of small capacities, with machinery and everything necessary for building and repairing vessels, including graving docks, large smith shops, 160-ton hydraulic crane and building slips. Torpedo and gunnery school ships are stationed at Spezia.

A sea wall extends over $\frac{1}{2}$ mile northward from Cadimare to the entrance of Darsena No. 1, and there are numerous coal sheds on it; at the southern end are the coal wharves for the use of Italian naval vessels, and there are depths of $1\frac{1}{4}$ to $5\frac{1}{4}$ fathoms along the frontage. Darsena di San Vito, the entrance to which is northward of the coal sheds, is small and divided into two parts, each with $1\frac{1}{2}$ fathoms water. The entrance to Darsena No. 1 is about 100 feet wide, and the area of the basin is about 19 acres, with depths of from 4 to 6 fathoms; Darsena No. 2, to the northward, has an area of about 20 acres, with depths of from $5\frac{1}{4}$ to 6 fathoms. From the entrance to Darsena No. 1 the sea wall trends northeastward about 600 yards to Molo della Lagora, which extends about 200 yards south-eastward from the sea wall, and northwestward of it is Porticciolo Militaire, a small camber; the harbor master's office, a yellow building with a flagstaff and landing steps, is situated on the north-eastern side of the entrance to the camber, and from it Mirabello Mole extends 200 yards northeastward.

Porto Mercantile or Commercial Harbor.—About 1,100 yards northeastward of the above-mentioned mole is the extremity of the East Jetty, which projects southward 745 yards from the northern bend of the gulf, Migliarina Shore; the inner part of the jetty, 340 yards long, is 59 yards wide, a railroad leads on to it and a custom-house and warehouses have been erected; the outer part of the jetty, of which the end curves to the southwestward, 400 yards long, is 5 yards wide, and within the space included by the mole and the jetty is Porto Mercantile or Commercial Harbor, which has depths of $3\frac{1}{4}$ fathoms. Dredging is in progress in the port; a new mole is to be constructed, and additional quayage provided.

There are three electric cranes which can be used by making formal application to the Spezia Chamber of Commerce.

The embankment along the shore, inside the harbor and in front of the public gardens, 217 yards long, has been completed.

The walls of the embankment and of the jetty are constructed of concrete blocks, ranging in weight from 25 to 30 tons, dropped into the foundation and raised to the height of sea level; above that line and to a height of $8\frac{1}{4}$ feet the walls are constructed of rubble masonry faced with bricks and coped with ashlar.

A line of mooring buoys for torpedo craft has been placed across the entrance to the port.

Cadimare Mole—Light—Buoys.—A mole is constructed in front of Cadimare Cove, the work of which is marked by 5 buoys.

An occulting red light has been established at the extremity of the mole.

Lagora Mole—Buoys.—Lagora Mole is under construction. Two buoys are moored on the prolongation of the mole. One, a can buoy, surmounted by a tripod supporting a red metallic flag, is moored 273 yards from the vertical red and white lights; the other, a lightbuoy exhibiting a flashing green light every 3 seconds, thus, flash 0.3 second, eclipsed 2.7 seconds, is moored 787 yards from the lights on the mole head. The lightbuoy will be known as the Lagora Mole Buoy.

Passage of vessels between the unlighted buoy and Lagora Mole is prohibited, but vessels drawing not more than $11\frac{1}{2}$ feet may pass between the lighted and unlighted buoys.

Dry docks.—See Appendix I.

Breakwater.—A breakwater 2,460 yards long, in course of construction, and now awash and in some places above the sea level, extends in a straight line northeast-southwest nearly across the gulf, between Sta. Maria Fort and Sta. Teresa Point, having at each extremity a narrow passage into the harbor; it is composed of rough blocks of stone, no portion of it being faced; both ends of the breakwater are above water. When completed it will form the head of the gulf into a perfectly sheltered harbor $2\frac{1}{2}$ miles long, with an average width of $1\frac{1}{2}$ miles and depths of 5 to 7 fathoms over the greater part of it.

Channels—Regulations.—The West Channel between Sta. Maria Fort and the southwestern end of the breakwater is 430 yards wide, with an average depth of 7 fathoms.

Owing to submarine works in progress, vessels entering by the West Channel must stop their engines when on a line joining the light on the western end of the breakwater with Sta. Maria Fort, and not start them again until on a line drawn from Varignano Point parallel to the first-named limit.

Vessels leaving must keep their engines stopped when between the same limits.

The East Channel—between a mole extending from Sta. Teresa Point and the eastern end of the breakwater—about 200 yards wide, has been dredged to a depth of $5\frac{1}{2}$ fathoms. Arrangements are made for depositing mines in these channels in the event of war.

The East Channel has been temporarily closed to traffic.

Storm signals.—Storm warning signals, in connection with the central meteorological office at Genoa, and similar to those made at other places on the coasts of Italy, are hoisted on a flagstaff of the harbor master's office, near the inner end of the west mole of the Commercial Harbor, at 39 feet above the sea.

Lights.—Northeastern end of breakwater: A group flashing red light, visible 7 miles, is exhibited from a mast on red pedestal, yellow dwelling, situated on the northeastern extremity of the breakwater. Should the apparatus be out of order, a fixed red light will be shown instead.

Santa Teresa Point: A group flashing green light, elevated 42 feet above the sea and visible 7 miles, is exhibited from a staff on pedestal at the end of the mole below Santa Teresa Fort. Should the apparatus be out of order, a fixed green light will be shown instead.

Southwestern end of breakwater: A flashing green light, visible 8 miles, is exhibited from an iron mast over shed on the southwestern end of the breakwater. Should the apparatus be out of order, a fixed green light will be shown instead.

Fort Santa Maria: A flashing red light, visible 8 miles, is exhibited from a staff on pedestal on the eastern angle of the rampart of Fort Santa Maria. Should the apparatus be out of order, a fixed red light will be shown instead.

From the northeastern pierhead, at the entrance to the outer basin (Darsena No. 1), at the naval arsenal, a small fixed green light is exhibited; and from the southwestern pierhead a small fixed red light is shown, both elevated 34 feet above the sea and visible 10 miles. The lights are electric, and are shown from black and white poles, each with a disk.

Two electric lights, placed vertically 6 feet apart, the upper light fixed white, and elevated 32 feet above the sea, the lower fixed red, both visible about 3 miles, are shown from an iron column erected at the extremity of Lagora Mole.

A small fixed white electric light is shown from the head of the little mole near the harbor master's office on the northern side of the entrance to the small military port.

From a gas lantern situated at the extremity of the mole projecting northeastward from the harbor master's office, two small fixed

red lights, 26 and 23 feet above the sea, are exhibited placed vertically, visible 3 miles; green sectors are shown to the southeast and northeast from a gas lamp at the unloading wharf.

From a metal tower, at the head of the East Jetty, Commercial Harbor, is exhibited, at an elevation of 19 feet, an alternating occulting white and green light. (See Light List.)

Fiat S. Giorgio Mole, eastern shore of the Gulf of Spezia, has been extended 200 yards to the westward.

A fixed white electric light, elevated 14 feet above the sea, is erected on the head of this new extension, 1,200 yards 324° from the light on the northeastern extremity of the breakwater.

Range lights.—A light is exhibited, at 157 feet above high water, from a pentagonal masonry tower, 44 feet high, and painted black and white in chequers, and surmounted by a masonry hut, on the town wall at Pegassano.

A light is exhibited, at 95 feet above high water, from a wooden staff, painted black and white in bands, and surmounted by an open-work disk, on the head of Veleria factory.

A light is exhibited, at 75 feet above high water, from a wooden staff, painted black and white in bands, and surmounted by an open-work disk, on the northeastern wing of the head of Veleria factory.

Fog signals.—From the eastern and western ends of Spezia Breakwater, during thick or foggy weather, a fogbell and hand foghorn will be sounded alternately every 10 minutes, or at a shorter interval if necessary.

From Santa Maria fort, during thick or foggy weather, a fogbell and hand foghorn will be sounded alternately every 10 minutes.

If a vessel is seen standing into danger a flare-up will be shown and directions given by megaphone, at each of the above three stations. (See Light List.)

Buoy.—A lightbuoy is moored 109 yards 63° from the two fixed red lights exhibited at the mole projecting northeastward from the harbor master's office.

Pilots.—There are licensed pilots for the Gulf of Spezia; they are stationed at Grazie. The pilot station extends to a line between Isola del Tino and Telaro Village on the east shore of the gulf, on which line the pilots take charge.

Anchorage.—The Gulf of Spezia may be considered a harbor of refuge, for it is easy of access, and shelter for every class of vessel can be found in one or other of its many bays, and when the breakwater is completed the space inside it will form one of the finest harbors in the world. A good berth will be found off the dockyard, in 6 fathoms water over mud bottom, the Lagora Mole bearing about 296° . As the squalls are sometimes very heavy down

the gullies between the mountains, necessary precautions must be taken. Another good berth is with a tower well up the hill at the back of the town, in range with the western angle of the castle, bearing about 316° , and Fort Pezzino, bearing 215° .

Mooring buoys.—There are several mooring buoys laid down in Grazie Bay, in Cadimare Cove and abreast the sea wall extending to the outer basin. Numerous moorings are placed off the dockyard in the northern part of the bay. Within and abreast of the southwestern end of the breakwater are seven buoys for the use of vessels adjusting their compasses. The buoys are painted in the following manner: The central in black and white sectors, and the other six, near, in red, distinguished with the numbers 1 to 6.

There are a number of buoys in the gulf, for which see the chart.

Prohibited anchorage.—In connection with the submarine defense of the Gulf of Spezia, vessels are prohibited from anchoring within the area included by a radius of about 650 yards around the southwestern lighthouse on the breakwater, also within the area included by a radius of about 385 yards around the northeastern lighthouse on the breakwater, and in Fornace Cove, eastern side Palmaria Island.

Merchant vessels are prohibited from anchoring.

(a) Between Isola del Tino and Punta Mariella, in a space about 400 yards wide measured westward from the eastern extremity of Isola del Tino and eastward from Punta Mariella.

(b) Northeastward of Isola Palmaria, in a space within a line running 50° 900 yards from Punta Mariella, a line running 50° true, 1,400 yards from 100 yards northwestward from Scuola Battery; and a line joining the extremes of these two lines.

(c) In the outer portion of Baia di Porto Venere and Seno della Castagna, northwestward of the preceding zone, within a line from the eastern end of that zone to West Breakwater Lighthouse; a line from the western end of the same line 335° to the coast southwestward of Punta della Castagna.

(d) Within a radius of about 650 yards around West Breakwater Lighthouse, and within about 380 yards around East Breakwater Lighthouse.

(e) Between the breakwater and a line joining the northern side of Punta Varignano and the northern side of the prohibited area around East Breakwater Lighthouse, including Seno del Varignano.

(f) Within 1.1 miles from the entrance to Darsena No. 1.

(g) Southward of a line joining the head of East Mole to Pirelli's works.

(h) On the oyster beds in the northeastern part of the gulf.

Prohibited fishing areas.—Fishing is prohibited in prohibited anchorage areas (*b*), (*d*), and (*e*) within about 200 yards around the northern part of Punta del Varignano; in Seno di Panigaglia between Punta Pezzino and Punta Fezzano to a distance of about 800 yards from the middle of the bay; off the entrance to the dockyard inside a line drawn 65° 1,600 yards from the southern end of the coal sheds northward of Cala di Cadimare; then to 100 yards south-eastward to Molo Lagora; then to 100 yards eastward of Molo Mirabello, and to the shore about 400 yards southwestward of Forte Coppuccini Basso; off San Bartolomeo building yard within 900 yards on each side of Punta San Bartolomeo and 400 yards from the shore.

Trawls or other bottom-raking contrivances are prohibited in prohibited anchorage areas (*a*) and (*c*).

Dragging the bottom in the gulf is forbidden for any purpose.

Measured distances.—A distance of 6,111 feet has been measured eastward of Isola del Tino; the running course is 57° true. The western limit is a stone beacon, 20 feet high, on the eastern side of Isola del Tino, in line with a post, surmounted by a disk painted black and white in stripes, near Capo dell' Isola; the eastern limit is the pillar on Torre Scuola in line with a white stone pillar in Batteria Castagna.

A distance of 7,139 feet has been measured southward of the breakwater; the running line is a staff on the south side of the tower of Castello San Torenzo in line with a staff on the tower of Casa Fabbriotti, Bagnola village, 55° , or an umbrella shaped beacon on the southern part of Punta Castagna in line with Porto Venere campanile, 235° . The limits are two poles, about 20 feet high on masonry pillars at each end of the breakwater, between and near the lighthouses, in line.

Time signal.—From the bastion at the root of Lagora Mole a gun is fired electrically at 23h. 0m. 0s. mean time of Greenwich, corresponding to noon of the fifteenth meridian east of Greenwich, this being the so-called Middle European time. Position: Latitude 44° 5' 54'' N., longitude 9° 49' 33'' E.

Repairs.—The works of the Continental Lead & Iron Co. are at Pertusola, and in addition to their business of lead and silver refining, have built and launched steel sailing vessels of over 2,000 tons, with fittings, besides steel steamers of 180 tons and 184 horsepower; they are prepared to undertake any kind of ironwork.

At the works of Messrs. Larini, Nathan & Co. they are prepared to carry out all orders for dock gates, pontoons, dredgers, bridge work, etc. The castings are made at the Milan works, where the firm has a steel foundry. The work delivered to the Royal

Dockyard include four dock gates, a steam dredger 134 feet in length, bridges, and portable iron houses for the Italian Royal Engineers, and orders for private firms.

Messrs. Pirelli & Co.'s submarine cable manufactory can turn out 10,000 yards of cable a day.

A shipbuilding yard has been constructed at Muggiano, near Pertusola, on the shore adjoining the lead works.

The shops, building, offices, etc., cover an extensive space of ground, and preparations have been made for much work. Vessels of over 7,000 tons have been built here.

Northward of San Bartholomeo Point on the eastern shore, about $1\frac{1}{4}$ miles from the head of the gulf, is a mole and building yard, which is now used as a Government torpedo and electrical store.

Artillery practice is sometimes carried out from the beach at Muggiano; a red flag is hoisted at the flagstaff of the old Batteria San Bartolomeo during the firing.

Repairs of any description can be effected at the Royal dockyard and the yards at San Bartolomeo, and also by the Cantiere di Construzione del Muggiano.

Port regulations.—It is not permitted to throw overboard any ashes or rubbish, but a dirt boat must be employed and paid for, and all refuse discharged outside the breakwater.

Picking up coal or other goods which have fallen overboard is absolutely forbidden in Golfo della Spezia, but special permission can be obtained from the harbor master's office to recover goods fallen overboard during operations of shipment or landing. Vessels are prohibited from throwing ashes overboard inside the breakwater.

Communication.—Besides the railroads already mentioned, the steamers of the Cunard Co. run direct between Liverpool and Spezia six times in the year. Spezia is in telephonic communication with Genoa, Rome, and other of the larger Italian towns.

Sea breeze.—In June a pleasant sea breeze usually springs up in the forenoon and dies away before sunset; it is very faint less than $\frac{1}{2}$ mile from the landing place.

Supplies are abundant, and water can be procured in Cadimare Cove, or on the eastern shore near Port Lerici, or from the municipality cistern boats. Near Cadimare is a submerged spring of fresh water, named la Polla; it has been proposed to make the water available for general purposes by conducting it through the salt water in iron tubes.

Water can be obtained from a pipe near the harbor master's office, and, probably, from pipes on East Mole, or from municipal tank vessels, on making a verbal request to the municipal authority. Naval vessels obtain water in the dockyard, or from steam-tank vessels, on application to the port admiral.

Coal.—About 7,500 tons are kept in stock by private firms; it can be brought off in lighters. Vessels can coal at all the wharves, with depths alongside of 28 feet and less. The Italian Government keeps a stock of 100,000 tons.

Spezia is not a coaling port except for the Italian Navy.

Liquid fuel.—The Italian Navy has a supply for the use of its own vessels, but no stock is kept in private hands.

The coast.—The northern head of the gulf is a flat and marshy shore, partially cultivated, and the slopes of the surrounding hills are thickly wooded. A large area in the northeastern part of the gulf is occupied by oyster beds.

Pirelli's large telegraph cable works are situated on the shore eastward of the head of East Mole.

One mile to the southward of San Bartholomeo Point and Mole is the village and works of Pertusola and Fort Teresa, immediately southward of which is a bay of considerable size on the northern side of this bay is a battery on Mount Falconara and the village and castle of San Terenzo; the castle is not easily made out.

Lerici, with a population of about 4,700, is a busy little town and fishing port on the southern side of the above-mentioned bay; the port is formed by a tongue of land projecting to the northwestward (on which is a very conspicuous old castle surmounted by a tower), on the northern side of which is a depth of 5 fathoms, shallowing to 2 fathoms at a short distance from the shore; from the extremity of the point projects a short mole. The head of this bay is shallow, but from $5\frac{1}{4}$ to 6 fathoms will be found abreast Lerici over a muddy bottom.

Lavoina Shoal.—About 400 yards 34° from the mole head is a small rocky shoal marked by an iron staff with flag.

Light.—A fixed red light, visible 2 miles, is exhibited from a red iron column, 11 yards within the mole head at Lerici, at an elevation of 23 feet above the sea. (See Light List.)

Buoy.—A red can buoy is moored in $5\frac{1}{4}$ fathoms, with San Terenzo Castle bearing 339° , distant 800 yards.

Maralunga Point, southward of Lerici, has on it a chapel; Maramozza or Sta. Catterina, Fiascarino, and other small bays indent the coast southward as far as the village of Telaro, $1\frac{1}{4}$ miles distant. From Telaro the coast is high and cliffy as far as Corvo Point (distant 2 miles), with a few rocks close off the several points; on the heights above are many scattered houses, and over Corvo Point are the village, church, and tower of San Marcello; there is also an old watch-tower upon the fall of the cliff. About $\frac{1}{2}$ mile 102° from Corvo Point is Bianca Point, and $\frac{1}{2}$ mile northeastward of the latter is the mouth of the Magra River; on the shore, at the foot of the wooded slopes of Mount Toroni, is the hospital of Sta. Croce.

Winds.—Southerly winds prevail in summer, and northerly and northeasterly in winter, but they are seldom dangerous. The sirocco sometimes is strong in winter, and accompanied by rain; it is indicated by Monte Castellana being covered with clouds, and the level of the water in the gulf rising.

During westerly winds strong squalls come down the gullies of the mountains westward of the gulf. In fine settled weather of summer the imbatta (sea breeze) sets in from the eastward about 10 a. m., veers gradually southward and westward, and fails before sunset.

The coast.—From Bianca Point to the Arno River a low sandy shore curves to the southward, and forms the open Gulf of Magra about $5\frac{1}{2}$ miles in depth by 25 miles wide. On the northern shore of the gulf the slopes of a high range of mountains approach within about 3 miles of the shore, Mount Altissimo attaining an elevation of 5,213 feet. Southward is the extensive plain of Pisa in which are several lakes, the isolated Mount Pisano rising conspicuously between the cities of Lucca and Pisa. Several rivers and small streams drain the low land, the principal being the Magra, Arno, and Serchio. Off the southern shore banks extend to a distance of $\frac{1}{2}$, and in some places $\frac{3}{4}$ mile, but the 5-fathom curve little exceeds 1 mile from any part of it; the bottom is chiefly mud.

The shore between Fiume Magra and Viareggio should not be approached to less than 500 yards, and the lead should be used.

Magra River, the entrance to which is of considerable breadth, is so obstructed by banks as not to be navigable. This river has a southeasterly course of about 35 miles, and at times swells to a destructive torrent; it is crossed by a railroad viaduct and a bridge a short way up. From 3 to $3\frac{1}{2}$ miles inland, at the foot of the hills, are the towns of Sarzana and the cities of Carrara and Massa; along the shores are several batteries.

Consul.—The United States is represented at Carrara by a consular agent.

Marina d'Avenza (di Carrara) is a long line of houses near the beach, about $1\frac{1}{2}$ miles southeastward of the mouth of Fiume Magra. Three long wooden piers extend off the beach, and there are about 11 feet water at their heads, which are fitted with rails and cranes, for shipping marble; there are no landing steps.

The town, with a population of about 3,300, has a fine old castle and is situated on the left bank of the Carrione River at about 1 mile from its mouth; large quantities of Carrara marble are shipped here, on an average about 200,000 tons being annually exported. There are two long wooden piers abreast the village with cranes for loading the coasters with marble, and there are depths of from 10

to 14 feet alongside the piers. The mouth of the river, near which are two batteries, is $3\frac{1}{4}$ miles eastward of Bianca Point.

The white Carrara marble, so valuable to sculptors, is found in inexhaustible quantities in the lower ridges of Monte Sagro, near several streams which unite not far from the city; the quarries employ upward of 10,000 workmen and extend over a space of 6 miles; the blocks are cut by water power and conveyed in bullock drays to Avenza.

Lights are usually exhibited from the pierheads.

Anchorage off the Marina is not very safe, but in fine weather it may be obtained about 400 yards offshore, between the piers.

Avenza and Carrara are situated about 1 and $2\frac{1}{2}$ miles, respectively, to the northeastward. Avenza is on the Genoa-Pisa railway.

San Giuseppe, 3 miles southeastward of Marina d'Avenza, is a group of houses on the shore, off which is a long wooden pier with a crane on its head. Fiume Frigido flows into the sea here.

Light.—A light is usually exhibited from the pierhead.

Fortified ports.—The mouth of Fiume Magra and Marina d'Avenza are considered fortified ports. See Regulations.

Fortino Cinquale, on the beach $2\frac{1}{2}$ miles southeastward of San Giuseppe, is small and quadrangular, with a yellow house on it.

Railroad.—There is communication by rail to Spezia, Pisa, Lucca, Carrara, and all principal towns.

Pietrasanta.—At $5\frac{1}{2}$ miles to the southward of Carrione River is Cinquale Fort (between two others), at the mouth of a stream, 1 mile inshore of which is Lake Porta; 6 miles 46° from the fort is Mount Altissimo. The town of Pietrasanta, with a population of 11,000, is situated 2 miles inland; it is surrounded by walls, has several fine churches, and in the neighborhood there are quarries of beautiful marble, besides mines of lead and quicksilver.

Forte dei Marmi, $2\frac{1}{2}$ miles southeastward of Fortino Cinquale, is marked by the houses of the village, which extends along the beach; a long pier, with a 10-ton crane on its head, and also a pier belonging to the powder factory, project from the shore. There are some red and white spots on the side of the mountain within the village, which are very noticeable when the sun shines fully on them.

Lights.—A fixed red light, elevated 19 feet and visible 5 miles, is exhibited from a yard, 8 feet above the head of the loading pier at Forte di Marmi, $14\frac{1}{2}$ miles southeastward of Spezia Breakwater. The pier is 265 yards long; both it and the light belong to a private company. (See Light List.)

A fixed white light, elevated 10 feet above the sea and visible 5 miles, is erected on the extremity of the new pier at the powder factory. (See Light List.)

Caution.—Approaching from the southeastward in rather thick weather, with Isola Palmaria and Porto Venere Mountains not showing clearly, and Isola del Tino and Punta del Mesco obscured, the low Magra Valley has been mistaken for Golfo della Spezia, and the spur from the high land terminating in Punta Bianca for the western shore of the gulf.

Viareggio, a seaport town of considerable size, is regularly built upon the northern side of a small stream, into which the surrounding level land and marshy lakes are drained by numerous canals. The port is formed by two shore moles, one on each side of the stream, and is defended by several batteries. A large red buoy is moored in $3\frac{1}{2}$ fathoms off the entrance to the port to facilitate hauling in or out. A shoal bank of 3 fathoms and under, extends for $\frac{1}{4}$ mile off the mole heads and 5 fathoms will be found at twice that distance. There is an export trade in statuary marble and the town is much frequented in the summer for sea bathing; the population in 1903 was 10,200.

The North Mole of Viareggio is 403 yards long; from the head a point extends 15 yards. The South Mole is 357 yards in length, and from the head a point extends $6\frac{1}{2}$ yards. (See Light List.)

Lights.—An occulting white light, elevated 46 feet above the sea and visible 9 miles, is exhibited from a red octagonal tower, 39 feet high, with square dwelling attached, situated a short distance northward of the Burlamacca Canal and about 300 yards northward of the entrance to the Port of Viareggio.

An occulting white light, elevated 21 feet, and visible 2 miles, is shown from the head of the North Mole, and a fixed green light, elevated 21 feet, and visible 1 mile, is shown from the South Mole-head; the two lights are shown from wooden poles, 11 and 12 feet high, respectively. (See Light List.)

Mole under construction—Lights.—Two vertical green lights, the upper 16 feet and the lower 14 feet above the sea, visible 3 miles, have been established on the head of the new mole in course of construction (1914), about 512 yards southward of the canal entrance at Port Viareggio. During high seas these lights are not exhibited.

In order to avoid the substructure of the mole vessels must not approach within 164 yards of these lights.

Signal mast.—An iron signal mast, 90 feet in height, has been erected near the seashore southward of the town.

The roadstead of Viareggio affords but indifferent anchorage, as it is exposed to westerly winds, and the holding ground is not good; a berth may be taken up about $1\frac{1}{2}$ miles westward of the piers in 7 or 8 fathoms, sand, or in 6 fathoms, sand and mud, at $\frac{1}{2}$ mile southward of the red octagonal lighthouse.

Artillery practice.—Vessels must not approach the coast within 2 miles between Viareggio and the mouth of Fiume Morto, 7 miles to the southward, during gun firing. When firing is taking place red flags are hoisted at the flagstaff southward of Viareggio, and near the customs barracks at Migliarino and San Rossore. One blank charge is fired before the practice begins, or if heavy guns are to be fired, two volleys 1 hour before, and one charge immediately before the commencement.

Serchio River enters the sea $4\frac{1}{2}$ miles southward of Port Viareggio; its mouth is obstructed by sand banks, which extend off it for nearly $\frac{1}{2}$ mile.

Midway between the river's mouth and Viareggio, and about 2 miles from the coast, is Lake Massaciuccole, about $1\frac{1}{2}$ miles in extent, with about 6 feet of water.

Lucca.—The city of Lucca, renowned for its manufacture of silk, is situated in the plain $10\frac{1}{2}$ miles inland on the banks of the river Serchio; it contains a population of about 74,000.

The Arno River rises in Mount Falterona of the Apennine range, 25 miles north of Arezzo; it flows by a most circuitous course to Florence, thence nearly west through a very rich valley to Pisa, and from thence to the sea, which it enters about $7\frac{1}{2}$ miles northward of Leghorn. Its whole course is about 150 geographical miles, and it is navigable for boats as far as Florence, a distance of 60 miles. On the southern side of the entrance is a fort. Sand banks and rocky ledges extend off both points at the entrance, that from the southern point having very little water over it at $\frac{1}{2}$ mile offshore; the entrance to the river should not be approached within 1 mile.

Pisa.—The ancient city of Pisa with its famed campanile or leaning tower is situated in a marshy but fertile plain about 6 miles eastward of the mouth of the Arno; its walls are about 5 miles around and contains a population of 61,279. It is the capital of a Province, and possesses a university.

A nearly straight flat coast continues southward for $7\frac{1}{2}$ miles to Leghorn; it is thickly wooded along the shore, the country within being low, marshy, and with several small lakes; it is drained by the Nuova River which enters the sea about $1\frac{1}{2}$ miles northward of Leghorn. On the shore nearly halfway between the Arno and Leghorn, is a fort.

Leghorn (Livorno).—This important seaport, the capital of a Province, is well and regularly built; the streets are broad, and the western part is intersected by canals. It is surrounded by a wall about $3\frac{1}{2}$ miles in circuit, and defended by fortifications; there is also an inner line of defense formed by broad canals, which intersect the city in various directions. The city contains a cathedral, several

churches and chapels, a monastery, hospital, public library, naval academy, an English church and cemetery, Scotch Free Church, seamen's bethel, and reading rooms. There are also mineral springs. The population of Leghorn (Livorno) is about 103,890, besides many English and foreign residents.

The naval academy, on the southern side of the city, is surmounted by a square tower with a flagstaff. Ardenza Village is about 1 mile and Antignana village about 2 miles southward of the city, and, on summer evenings, the various bathing establishments on the coast are lighted by numerous arc lights until about midnight.

There are no special hospitals or homes for seamen; the civil hospital is available. The united hospitals of Leghorn receive seamen of all nationalities in cases of emergency.

Consul.—The United States is represented by a consul and vice consul.

Trade.—The principal exports consist of oil, wine, straw hats, marble, coral, candied fruit, hides, boracic acid, hemp, mercury, rags, soap, wax, eggs. The imports are iron, coal, coke, cotton, wool, wheat, coffee, hides, jute, mineral oil, sulphates of coppers and iron, tobacco, carbonate of soda, and cured fish.

The principal industries are glassworks, candied fruit, hemp, pastes, patent fuel, pumice stone, rag picking, soap, tanneries, sienna earths, metal works, rolling mills, and ship building, the firm of Messrs. Orlando Bros., employing a large force of workmen; the drydock, the property of the Italian Government, has been leased to the firm until the year 1920. Numerous boats are employed annually in coral fishing on the coast of Africa.

Communication.—There is railroad communication with Pisa, 11½ miles distant, and thence northward and eastward; also along the south coast to Rome. The station is on the northern side of the town, and the lines of rail extend round the municipal dock. A line of railroad has been constructed from Leghorn to Vada, thus putting Leghorn on the great main line running between Turin or Milan, through Genoa and Pisa, to Rome. All main-line trains now stop at Leghorn. The railroad station is to the westward of the town. There is also a canal between Leghorn and Pisa. Steamers formerly ran regularly to London, Glasgow, Antwerp, Marseille, Genoa, Naples, Venice, and other ports, including the islands of the Tuscan Archipelago, Sardinia, and Malta.

The port comprises an inner and outer harbor. The inner, named Mediceo Port, is formed by a broad mole, Mediceo Mole, extending from the southern shore for about 760 yards in a northern direction, the space within being protected from the northwest by another mole

(Rettilinea), projecting some 560 yards in a southwestward direction. Within these two moles, with the exception of a portion on the southern side, a general depth of 26 feet has been obtained by dredging. In the shoaler portion the depths are 20 to 22 feet. The northern part of the harbor known as the Municipal Dock (Darsena del punto Franco) is still further inclosed by small moles, and has from 19 to 25 feet water over it. Near a tower in the northeastern corner of the harbor is the entrance to the Old Dock, in which are depths of from 13 to 18 feet over its greater part, and communicating northward with inner basins.

In the southwest corner of the harbor is another entrance (with swing bridge) leading into the New Dock which has been enlarged and deepened.

Dredging in progress.—Extensive dredging operations have been and are still being carried out in the Outer Port.

Dredging operations are carried on in the Outer Port near the center part of the Curvilinea Mole and southern entrance.

A dredger and rock-boring vessel will be employed on this work, and will remain in position during the night.

Caution.—In consequence of these works and of the works in progress for the extension of the port, the greatest care should be taken by vessels entering either by the northern or southern entrances.

Dredging operations are now in progress in the entrance to Mediceo Port, and along the southern side of Rettilinea Mole.

The mooring chains are marked by red flags and red lights, and vessels should take the greatest care to avoid them.

Owing to dredging operations now in progress, vessels are warned that, until further notice, they should use the North Entrance to the port, but should enter or leave by the South Entrance only. From a report in 1916 it is stated that the South Entrance is considered the best for large steamers, and that the harbor depth is about 24 feet and the anchorage good.

Depths.—There are depths of from 17 to 30 feet in the North Entrance to Porto Nuovo, or New Port, and of from 30 to 40 feet in the fairway of the South Entrance; in the port there are depths of from 20 to 30 feet, but the water shoals gradually eastward to Molo Mediceo, alongside which there are 10 and 12 feet.

There is a least depth of 22 feet in the entrance to Old Port, and depths of from 21 to 27 feet in Porto Mediceo, of 23 feet in Darsena Mandraccio, of 28 feet in Bacino Commerciale, of 13 to 21 feet in Darsena Vecchia, and of 9 to 27 feet in Darsena Nuova.

Dredger signals.—When the dredger is at work it will display three black balls, placed vertically, by day, and three fixed red lights, placed vertically, in addition to a fixed white light at each end, by night.

While employed in the northern entrance to the Outer Port the dredger will remain outside the harbor except in bad weather.

Buoyage.—Four spar buoys, situated as undermentioned, are temporarily established to mark the northern channel of approach to the port. They will be later on replaced by lightbuoys.

One buoy is painted red, and should be left on the starboard hand when entering the port, and the others, which are in line on a 337° – 157° line of bearing, should be left on the port hand.

Mooring Buoy.—A cylindrical mooring buoy is placed about 150 yards westward of the office of the captain of the port.

Harbor works.—A new basin is under construction northward of the existing port. The northern mole, which has been completed, extends in a southwesterly direction about 1,600 yards from Marzocco Tower; the western mole will extend in a north-northwestward direction from the northern end of the Curvilinea Mole.

Light.—An unwatched red occulting light, visible 3 miles, is erected on the outer extremity of the new Marzocco Mole, about 1,554 yards 226° from Marzocco Tower.

The light is exhibited, 16 feet above the sea, from an iron hut on a stone foundation.

Lightbuoys.—A lightbuoy, exhibiting a fixed green light, is moored at a distance of about 768 yards 339° from the lighthouse on the northern end of Curvilinea Mole in connection with the new harbor works now in progress. Vessels should pass at a distance of not less than 100 yards northward of the lightbuoy.

This buoy marks the northern extremity of the works in progress for the construction of Diga di Tramontana.

Docks.—The amount of wet dock accommodation is over 12 acres, with 20 to 24 feet depth of water and 72 feet breadth at entrance; within the basin is a graving dock and three patent slips; the former, 443 feet long, $72\frac{1}{2}$ feet broad, with a depth of $23\frac{1}{4}$ feet water over sill at high water; the latter are 250 long, have 27 feet breadth of entrance, and are adapted for vessels of 1,500 tons weight. The tonnage of the largest vessel yet docked is 4,500 tons and draft $22\frac{1}{2}$ feet. Mooring buoys are laid down in Mediceo Port.

There is a drydock and a patent slip on the northern side, and a patent slip on the southern side of Darsena Nova. (For particulars see Appendix I.)

There are fortifications upon the southern side of the harbor and a fort at the Curvilinea Mole Head.

On the beach $\frac{1}{2}$ mile northward of the city is the Marzocco Tower of very ancient structure. It is built of white marble and has a conical red roof; surrounding it near the top is a projecting gallery.

The Outer Harbor is protected from the westward by a detached curvilinear mole over $\frac{1}{2}$ mile in length, terminating in two circular heads on which are light towers; it extends north and south in front of the entrance to Mediceo Port, the northern head being about 400 yards 294° from the entrance to Mediceo Port; in the channel between the two moles (Curvilinea and Rettilinea) there is a depth of $26\frac{1}{2}$ feet.

The southern head of Curvilinea Mole is about 800 yards from the shore end of Mediceo Mole, but the passage between is narrowed to 250 yards by Piana Rocks and a shallow flat which extends from them to the eastern end of Vegliaia Mole. At 200 yards inside this flat and about 500 yards from the southern end of Curvilinea Mole are the Piana Rocks, on which is a lighthouse from which two groynes extend in a 334° and 80° direction, respectively. In the southern channel is a depth of from 5 to 6 fathoms. Over the greater part of the Outer Harbor there is a general depth—obtained by dredging—of from 25 to 28 feet, but on the flat extending between Mediceo Mole and Piana Rocks there are depths of only 3 to 6 feet. In 1899 the depths near the Curvilinea Mole were reported to have decreased.

The harbor is further protected on the south by Vegliaia, commencing at Vegliaia Rock and extending in a 285° direction. This new work commenced in the year 1889, was completed in 1894; it is 1,620 feet long and 46 feet in breadth. The western extremity of the mole is marked by a lighthouse.

The shore is faced by a wall as far to the southward as Cavalleggeri Point, about 1 mile from the mole head; $1\frac{1}{2}$ miles farther is Ardenza Tower, and between is the naval academy. A beautiful drive leads from the city along the shore and past the academy to Ardenza and Antignano, favorite seaside resorts in summer.

Semaphore.—To the northward of the town there is an electric semaphore station, and a petroleum reservoir capable of holding 3,000 tons of oil.

Meloria Bank and Tower.—This shoal of sand and mud, with occasional patches of rock and weed (within the line of 5 fathoms), extends about $4\frac{1}{2}$ miles in a north and south direction, and is from 1 to 3 miles broad; it lies parallel with the shore, from which it is distant 3 miles, sheltering the roadstead from westerly winds.

The greater portion of this bank has only from 9 to 12 feet water on it; the shoalest part is near the south end, where, on a rocky patch above water, stands Meloria Tower, a square building, with arched openings at the base, about 200 yards southward of which is a lighthouse erected on iron piles.

Between Meloria Bank and the port are shallow patches of sand, mud, and weed, having over them depths of $2\frac{1}{4}$ and $4\frac{1}{4}$ fathoms; the largest, named the American Shoal (the most western), is about 2 miles 285° from the northern end of Curvilinea Mole. Northward of the port, abreast Marzocco Tower, there is a depth of only $3\frac{1}{2}$ fathoms at $1\frac{1}{2}$ miles from the beach.

Southward of the port the water is deeper, there being 5 fathoms at a distance of $\frac{1}{2}$ mile from the shore.

Vegliaila Rock.—Nearly 800 yards southward of the southern head of Curvilinea Mole, and near the edge of the flat before mentioned as extending from Piana Rocks southward, is the Vegliaila, a small detached rock. As previously remarked, a mole extends from Vegliaila Rock in a 285° direction.

Piana Rocks lie in the southern entrance to the Outer Port; they dry 5 feet and are marked by a lighthouse.

Lightvessel.—From a red lightvessel moored in 4 fathoms off the northern end of Meloria Bank, a fixed white light, elevated 33 feet above the sea, and visible 11 miles, is exhibited from a red iron openwork tower, surmounted by a red globe.

When Meloria Bank Lightvessel is not on her station the lower half of the black iron openwork tower will be painted white, and at night the lights will be extinguished.

The following day and night signals are made:

Day.	Night.	Signification.
1. Black flag with white ball in center.	Yellow flare every 15 minutes.....	Doctor needed.
2. Black and white checkered flag.	Yellow and red flares alternately every 15 minutes.	Apparatus damaged.
3. A black ball.....	Red flare every 15 minutes.....	Assistance urgently needed.

Fogbell.—A bell is sounded in foggy weather from the lightvessel.

Lights—Meloria Shoal.—From a hexagonal iron frame on the southern end of Meloria Shoal a flashing red light is exhibited at an elevation of 60 feet above the sea; visible 10 miles.

Vegliaila Mole Light is a flashing green light, elevated 56 feet above the sea, and visible 5 miles.

The lighthouse, 62 feet high, is an iron truncated pyramid, painted white.

(For arc of visibility see Light List and chart.)

Piana Rocks.—From a white cylindrical tower on the rocks in the South Channel a flashing white light is exhibited at an elevation of 154 feet above the sea; visible 19 miles.

Curvilinea Mole.—A flashing light with red sector, visible 8 miles, is exhibited from a yellow octagonal tower elevated 67 feet above the sea, on the southern head of Curvilinea Mole.

(For arc of visibility see Light List and chart.)

An occulting light with green sector, visible 12 miles, is exhibited at an elevation of 67 feet above the sea from an octagonal yellow tower at the north head. Vessels will avoid too close an approach to Meloria Bank on the north side, by keeping the green light in sight.

An occasional fixed green light, visible 1 mile, has been established near the northern end of the Curvilinea Mole, at a height of 33 feet, from the same tower as the occulting light.

This light will only be shown when the lightbuoy marking the construction work is not in position.

(For arc of visibility see Light List and chart.)

Bettilinea Mole.—A fixed red light is exhibited, 13½ feet above the water, from a window in the small tower at the end of the mole.

Beacon.—A beacon, surmounted by a staff and cone, painted black and white horizontal stripes, has been erected on the rocks on the eastern side of the southern entrance to the Outer Port, in a position bearing 258°, distant 115 yards from Piana Lighthouse.

Leghorn Roadstead, between Meloria Bank and Curvilinea Mole, affords good anchorage in from 4½ to 6 fathoms, sand and mud bottom, covered with weed. The ground is very uneven, numerous knolls being scattered over the roadstead, having depths of from 3½ to 4½ fathoms over them.

With the wind offshore there is smooth water, but heavy squalls may occasionally be expected.

Vessels generally moor with the best bower to the westward, and open hawse to the southward, from which direction with southerly winds a heavy ground swell sets in.

If entering from the northward, the best berth is with Piana Lighthouse bearing 147° and Meloria Tower bearing 237° in 4½ fathoms; or Piana Lighthouse bearing 130° and the tower either 237° or 226° in 6 fathoms. In either of these positions Gorgona Island will be well open northward of Meloria Tower.

Approaching from the southward, there is also good anchorage in moderate weather between American Shoal and Curvilinea Mole, in from 5 to 7 fathoms, with Meloria Light bearing 260° and the light on the southern end of the Curvilinea Mole bearing 125°; but the water shoals quickly to 4½ fathoms northward of this position, and Meloria Light should not be brought to bear southward of the above bearing.

A large vessel will find temporary anchorage in 8½ fathoms, at 1,000 yards westward of the southern end of the Curvilinea Mole, but a moderate westerly breeze raises an inconveniently heavy sea.

Sea level.—There is an occasional rise in the level of the water in the Port of Leghorn of 1½ feet, the water being highest with southwest winds.

A current is generally found setting either to the northward or southward through the road, and at times with considerable strength to the northward and westward; the direction, however, appears to be greatly influenced by the wind. A report states that on July 16, 1888, a very singular rush of water occurred at intervals of one hour, sometimes every half hour, raising the water 1 foot to 1½ feet. After remaining for about 15 to 30 minutes, the volume of water would rush out of the harbor again, causing great difficulty in keeping the vessel at her moorings. The wind was moderate from west-southwest and moderate sea outside.

Pilots go out to vessels on the usual signal being made, and no vessel should attempt to enter the port of Leghorn without one. Pilot boats are painted black with a white rim round the top. The pilot flag is blue, white and blue with a blue anchor on the white stripe. The sail is white with a black anchor in the center. Masters of vessels should be careful whom they take on board at night time. The authorized pilots carry a certificate from the captain of the port stating that they belong to the licensed body ("piloti pratici").

Port regulations.—Vessels on arrival are to anchor in Porto Nuovo, near Diga Curvilinea, so as not to impede the entry and exit of other vessels. On receiving pratique they are to anchor in the position assigned to them by the agent of the captain of the port.

Vessels under observation for quarantine are to moor near the northern end of Diga Curvilinea, with one anchor in summer and two in winter, and their sterns hauled to bollards on the mole by two or more hawsers.

If, on account of heavy southwesterly winds, it is necessary to lie head to the sea, the stern hawsers are to be taken to the bows, in order to keep the vessel near the mole, and to be able to secure as before on the wind moderating.

Entry into Porto Vecchio is prohibited to any vessel subject to medical inspection.

Naval vessels and vessels which have anchored in Porto Nuovo by order, must haul their sterns to the central or southern portions of Diga Curvilinea, and, should strong southwesterly winds set in, shift the hawsers to the bows as above directed.

Vessels placed in quarantine are to anchor in Leghorn Road.

Naval vessels and merchant vessels must land all munitions of war at Fortezza Vecchia before mooring in Porto Vecchio.

Vessels on entering Porto Vecchio must rig in their jib booms and brace their yards forward.

Vessels in Porto Vecchio are moored at right angles to the quays, except at the petroleum quay, where they go alongside. The outer part of Molo Mediceo is reserved for large steamers, and the inner part for large sailing vessels.

Vessels in Porto Nuovo, or alongside Diga Rettilinea, or near the captain of the port's office, and the outer vessel or vessels at the head of a line on the side of Porto Vecchio are to carry an anchor light.

Vessels are prohibited from anchoring off the captain of the port's office.

Vessels in Porto Mediceo are not allowed to load or discharge inflammable cargoes; this must be done, with permission previously obtained, in an isolated position in Porto Nuovo, or alongside the outer part of Diga Rettilinea, and a watchman must be kept on board, but the watchman may not be required in vessels with straw, hemp, benzine, or spirit or board packed in cases, nor in vessels loading or discharging petroleum or methylated spirit in certain small quantities.

Darsena Mandraccio may not be entered without a special written permission from the captain of the port.

Vessels granted permission to go alongside the quays are to leave their berths at the time stated on the permission, whether they have or have not completed loading or discharging, and the completion must be done in the road.

Vessels secure to Diga Rettilinea under special regulations.

Steamboats within the port are to go at a slow speed.

No vessel may remain secured to a warping buoy, but mail steamers may occasionally be allowed to do so for a few hours.

Ashes and all other rubbish must be put into boats provided for the purpose by vessels in the port.

Pilotage is compulsory, and no vessel should enter the port without one. The pilot station is eastward of Banchi della Meloria, and includes the ports of Leghorn. The pilot's office is on Molo Mediceo near the southwestern corner of Porto Mediceo.

Directions.—Vessels bound to Leghorn from the westward usually make the Island of Gorgona, which being over 800 feet in height is a conspicuous landmark; it bears about west-southward 18 miles from the port. The Livorno Mountains rise conspicuously from the shore a little southward of the city and stretch from thence far toward the eastward; northward will be seen the isolated Mount Pisano, surrounded by the great plain, upon which may be distinguished the city of Pisa and its celebrated tower.

On nearing the coast Piana Lighthouse stands well out from the background, especially if seen from the northward; the cathedral clock tower and dome of the Dominican Church are also conspicuous objects, as is the tower of Marzocco, and, when nearer in, the tower on Meloria Rock.

In heavy gales of wind from the southward and westward the sea breaks over the whole of Meloria Bank, and at such times vessels are not permitted to enter the inner harbor.

North channel.—Pass northward of Banchi della Meloria Light-vessel, and bring Livorno High Light in range with the lighthouse on the north head of Diga Curvilinea, 155° . Keep this mark in range until Banchi della Meloria Lighthouse bears about 210° , when steer to one of the anchorages in the road. North channel into Porto Nuovo is closed to navigation at present.

At night.—Pass northward of Banchi della Meloria, enter the green sector of Diga Curvilinea North Head Light, and keep that light in range with Livorno High Light; anchor in the road with the high light bearing about 137° , when it is a little open southwestward of Diga Curvilinea North Head Light, and Banchi della Meloria Light 220° .

South channel.—Approach the south channel into Porto Nuovo with Livorno High Lighthouse in range with the campanile of the cathedral, 60° , which mark leads about $1\frac{1}{4}$ miles southeastward of the 5-fathom curve of Banchi della Meloria, and about 200 yards northward of Diga della Vegliaia Lighthouse; thence pass about 100 yards southeastward of Diga Curvilinea South Head Lighthouse and steer northward in the port.

For the road, steer northward passing about 1 mile outside Diga Curvilinea, and anchor in either of the berths mentioned below.

At night approach with Livorno High Light open southward of Diga Curvilinea South Head Light, and bearing about 60° ; when Banchi della Meloria Light bears 330° , steer 31° , and anchor when Diga Curvilinea North Head Light bears 96° , distant 1 mile. To enter the port, pass between Diga della Vegliaia Light and Diga Curvilinea South Head Light, round the latter light at the distance of 100 yards, and steer northward in the port.

Diga della Vegliaia Light is obscured over the shoal water to the eastward of it; there is no ship passage eastward of the mole.

Caution.—Vessels entering the port by the South Channel should pass northward of the light on the extremity of Vegliaia Mole, keeping within the arc of red light shown from the southern extremity of the Curvilinea Mole, until past Vegliaia Mole. There is no passage for vessels eastward of Vegliaia Mole.

Telegraph.—A submarine cable is laid between Leghorn and Macinaggio in Corsica, also between Leghorn and Gorgona. This latter cable is landed at Leghorn near the public baths and the Leghorn-Corsica cable house; its direction is marked by two beacons. The rear beacon is provisionally situated near the wall of the Cantiere Orlando, and will probably be moved to the Leghorn-Corsica

cable house. The front beacon, with the notice board, is situated 26 feet seaward of the Leghorn-Corsica cable house and bears 266° from the rear beacon.

The cable is laid 264° for a distance of 1,500 yards and thence 236°.

Supplies are abundant; water is brought off in tanks and pumped on board; it is good for drinking.

Coal.—About 6,200 tons of coal are kept in stock by various firms who, in 1911, imported 184,500 tons; one firm imported 80,000 tons of patent fuel and keeps 1,000 tons in stock. The usual method of coal-ing is from lighters, and 400 tons can be delivered in a day; vessels can, however, coal alongside Rettilinea Mole in the Municipal Dock, where the depth is 22 to 24 feet. Masters of vessels have objected to this berth on account of its exposed position to southwest winds, causing their vessels to dump on a projecting ledge of masonry; it is reported to be safe if the vessel is properly secured.

Tugs.—There are several tugs, but there is no fixed charge, so it is necessary to make an agreement before engaging one.

Repairs.—The firm of Orlando Bros. have appliances for executing any kind of repairs; at their works the battleship *Lepanto*, of 14,000 tons displacement (4,400 tons when launched), was built. They possess large steam hammers, 75-ton crane, and have building slips enabling vessels of the following lengths to be constructed at one time: 1 vessel up to 493 feet in length, 2 vessels up to 362 feet in length, 1 vessel up to 263 feet in length, 2 vessels up to 246 feet in length. They have also made engines of 19,000 horsepower.

Quarantine.—Vessels infected have to anchor in the roadstead near the Meloria Lighthouse until instructions are received from the ministry of marine, when they are sent to the lazaretto anchorage at Asinasa, Sardinia.

Chronometers.—There is an astronomical observatory at the naval academy, and comparisons can be made, by request, with the clock there.

Isola Gorgona (ancient Urgos), 18 miles west-southwestward of Livorno High Lighthouse, is about 1½ miles long north and south and 1,700 yards broad; it is hilly, and partly wooded. The coasts are generally steep, with a few rocks in places within 100 yards. The west coast is precipitous, and Punta Gorgona, the summit of the island, 837 feet high, is about ¼ mile within it, and surmounted by a semaphore; a conspicuous old tower stands on the ridge, 682 feet high, northward of the summit. The island is a convict settlement, and landing is prohibited except by permission of the Prefettura di Livorno. The finest anchovies are procured here.

There are four coves, Cala Maestra on the northwest, Cala dello Scalo and Cala Martino on the east, and Cala Sciro on the southeast.

Cala dello Scalo is the principal landing place, and from it the semaphore bears about 250° ; there are a few red houses on the shore occupied by fishermen. Torre Nuoca is a high fort northward of the cove. A mooring buoy lies in 22 fathoms water in the entrance to the cove.

Cala Martino is about 400 yards southward of Cala dello Scalo.

Cala Sciro is marked by Torre Garibaldi, a square stone tower, 430 feet above high water, on the northeastern side; there is anchorage midway between the entrance points of the cove, in 7 fathoms, sand and weed.

Cala Maestra is semicircular, and its entrance is about 600 yards wide.

Semaphore.—A semaphore has been established on the summit of Gorgona Island, 858 feet above high water.

Telegraph.—A submarine cable is laid to Leghorn. The cable is landed on the eastern shore, near the landing place northward of Cala Martino.

The front beacon, with the notice board, is attached to a house 55 yards from the water, and bears 86° from the rear beacon.

The cable is laid 86° for a distance of 600 yards, and thence 75° .

Soundings.—To the westward of the island there are 100 fathoms within 2 miles of the shore, and toward Leghorn the depths are from 95 to 50 fathoms, sand and mud, at 6 miles distance; thence to within 6 miles of the port the soundings gradually decrease to the 10-fathom curve surrounding Meloria Bank. Northward of Gorgona the 100-fathom curve is within 20 miles of the coast of Italy, approaching within 8 miles abreast the gulf of Specia; thence it gradually approaches the shore, keeping from 2 to 4 miles off, right around the head of the Gulf of Genoa.

Directions for the Gulf of Genoa.—In the summer season the wind is generally from west, southeast, or southwest with fine weather; in August there may occasionally be violent northwest winds, but they are not of long duration. If bound to Genoa from the westward keep the vessel full when crossing the Gulf of Lyons, and, making the land about Hyères Islands, pass from thence in sight of the coasts of Provence and Italy, but sufficiently distant to avoid the current running to the westward. If bound to Leghorn from Hyères Islands, steer to make the island of Gorgona. If bound to the southward of Leghorn steer for Cape Corso, passing at a short distance and either north or south of Elba, according to the port of destination.

Vessels from the coast of Africa westward of Algiers, bound to Genoa or Leghorn, make the land in the vicinity of Hyères Islands,

to insure their passage in case the wind should haul to the northwestward. In most cases the sooner the coast of Provence is made the more secure is the voyage, unless, on leaving the coast of Algeria, the wind should be settled from southeast to southwest.

In winter, when westerly winds prevail (between northwest and southwest), vessels as a rule should keep near the coast of Spain if bound to the Gulf of Genoa, for should the wind be southwest on that coast, with the appearance of bad weather, in all probability a northwest gale will be met with in the Gulf of Lyons; under these circumstances the Catalanian coast affords excellent shelter. However, vessels may cross the Gulf of Lyons in a moderate northwest gale if bound to the coast of Genoa or to other Italian ports, and the weather must be very bad if they are unable to reach the coast of France between Hyères and the Gulf of Jouan. If when near the land and the wind from the northwest reaches to the eastward of Toulon, there is nothing to prevent a vessel running along the land as far as Cape Mele; but if the wind moderates and veres to the eastward, with strong variable squalls, it is a sure sign of a northeast gale in the Gulf of Genoa. With the wind at northwest hauling to the west, Genoa will probably be reached without difficulty, and if the port can not be entered an anchorage may be taken in the road. With a southwest wind and an appearance of bad weather, Genoa had better be avoided, especially at night, and an anchorage taken up at Spezia, which is easy of access at all times.

If on arriving at the entrance to the Gulf of Genoa a gale should be blowing from the northeast, the vessel should wait under the land until the wind either moderates or changes, as the gales from the gulf are not of long duration. When in the gulf, if overtaken by a gale, try to get under the coast of Genoa; but if too far in the gulf, or too far to leeward, run for the island of Elba, where there is excellent shelter in all weathers.

If bound to Leghorn, it is not necessary, even in winter, to keep so close to the coast, unless there are signs of a gale from the Gulf of Genoa, when it would be more prudent to keep the coast as far as Cape Mele and cross from there, for it is possible that the strength of the wind and the velocity of the current combined may not allow Cape Corso to be doubled. Under these circumstances vessels have been obliged to run for the strait of Bonifacio, whence they can easily proceed to their destination with the southeast winds which blow to the eastward of Corsica.

Under all circumstances when doubling Cape Corso in winter, whether with strong easterly or westerly winds, give it a wide berth, as dangerous whirlwinds and squalls come off the cape; these, however, are not felt more than 6 or 8 miles from the coast.

The coast from Leghorn trends about south-southeastward as far as Cape Cavallo, 15 miles distant; the greater part of the distance it is broken and rocky, but as far southward as Cape Castiglione, is clear of danger within $\frac{1}{2}$ mile of the shore. Fort Antignano is 3 miles from Leghorn, and that of Romito about 6 miles; on the point between the forts are two towers, $1\frac{1}{2}$ miles northeastward of which is the peak of Mount Nero, a useful landmark.

Semaphore.—A semaphore, available for public service, is situated on Montaccio, $4\frac{1}{2}$ miles southward of Leghorn, at an elevation of 830 feet above the sea.

Cape Castiglione projects about $\frac{1}{2}$ mile toward the southwest and has a few rocks lying close off it; on the cape is a battery and a tower. Three miles inland eastward of the cape on a hill, is a conspicuous mill, with the village of Rosignano a short distance southward of it. On the southern side of the cape is the small port of Vecchio, whence to Vada passing the mouth of the River Fine, the distance is about $3\frac{1}{2}$ miles. Here the coast changes its character, the country for more than 2 miles in being flat and marshy, and the coast a sandy beach with shoal water extending a considerable distance from the shore.

Vada.—At Vada or Val di Vetro, a small village $3\frac{1}{2}$ miles to the southward of Cape Castiglione, are a fort, a tower, and a pier.

Vada Rock.—A shallow bank extends from off the shore for about $1\frac{1}{2}$ miles, having only 5 feet water on some parts of it. At $4\frac{1}{2}$ miles 246° from the fort is a detached rock with 5 feet water on it, and the water is shoal all around it for a considerable distance; a bank having from 6 to 10 fathoms on it, connects the above rock with the coast, and $1\frac{1}{2}$ miles 125° from the rock are several patches of 4 and $4\frac{1}{2}$ fathoms. The shoal is the supposed submerged city of Vada.

Lights.—On the above rock is an iron hexagonal framework dwelling, from which, at an elevation of 55 feet above the sea, is exhibited a flashing white light, visible 13 miles. (See Light List.)

The following signals are made by day:

1. A black flag with white ball in center signifies doctor needed.
2. A black and white checkered flag signifies apparatus damaged.
3. A black ball signifies assistance urgently needed.

An occulting red light elevated 62 feet above the sea and visible 4 miles, is exhibited from a white pyramidal tower, with square base, situated in the town of Vada. (See Light List.)

Anchorage.—On the bank, halfway between Vada Rock and the shore, is a convenient anchorage with offshore winds in from 6 to 8 fathoms water, good holding ground.

Cape Cavallo is 2 miles to the southward of Vada, and $1\frac{1}{2}$ miles farther in the same direction is the mouth of the River Cecina, off

which are rocky patches extending $\frac{1}{4}$ mile from the shore; a short distance south of the river is Fort Cecina. In the vicinity are smelting works.

The coast.—From Cape Cavallo a low sandy and wooded coast forms a regular curve to the point of the promontory of Piombino bearing 178° , distant 20 miles. The depths shoal gradually towards the shore, which may be approached within $\frac{1}{2}$ mile. Beyond the tower of Bibbona (4 miles from Cecina), and near Caresta Ravine, the hills approach nearer the coast. On the slope of a hill, 2 miles southeastward of the entrance to Caresta River, is Babel Tower, and $1\frac{1}{2}$ miles northeast of it is the belfry of Castagneto. On the shore 4 miles beyond the river, is St. Vincenzo Tower; near it are some cottages and a ruin; the slopes of the hills are well cultivated and thickly wooded.

The Modane, Turin, Genoa & Rome Railway is at this point very close to the coast.

A short distance southward of the tower, and about $\frac{1}{4}$ mile from the coast, is the lake or swamp of Rimigliano, about $4\frac{1}{2}$ miles in length and $\frac{1}{2}$ mile in average width. There is a coast-guard house 2 miles to the southward of the tower, off the shore on both sides of which are several scattered rocks. Three miles farther southward is Stella Point, 400 yards northward of which is a rock above water with no passage between it and the shore. In the bight eastward of the point is a tower and another of older date a short distance beyond.

Port Baratti.—Southward of Stella Point a rocky elevated coast trends to the southward and westward, forming a sandy bay between the above point and the headland of Piombino; the bay is about 1 mile in breadth and nearly that in depth, but is rocky and shoals $\frac{1}{4}$ mile from its head; outside this distance the depths increase gradually from 5 to 10 fathoms. On the southern side of the bay is the town of Baratti, near which are a small pier and several cottages, and on the shore of the bay and wooded hills around, are a chapel and other buildings. On the cliffy point forming the southern side of the bay is Populonia Tower and Village, near which is the site of the Etruscan Town and Port of Püpluna; the bay is open to the northward.

Tunny fishery.—Tunny nets extend in a north-northwest direction, 164 yards from the land under Populonia Tower and Port Baratti.

CHAPTER IV.

WEST COAST OF ITALY—PIOMBINO TO CAPE SPARTIVENTO— MESSINA STRAIT.

Piombino.—The promontory of Piombino, extending 5 miles in a southerly direction from Populonia Tower, is of considerable elevation; the land between it and the hills in the interior being low, it has, when approached from the north or south, the appearance of an island. The western shore of the promontory is bold and cliffy, having 10 fathoms at a short distance. Falcone Rock is high, and lies close off the southwestern point; rocks lie in the passage between it and the shore.

The town of Piombino, population 4,000, is on the southern side; it has a citadel (on the west) besides several other forts, and on the eastern side is an old semaphore (closed), the buildings of which are painted in black and white checks. In the immediate neighborhood of Piombino there are extensive ironworks.

La Rocchetta Mole, about 200 yards in length, projects to the southward of the town of Piombino, having a fort at the head; another projection extends westward from the inner end of the mole. Round the mole head are shelving rocks for a short distance, and the little port thus formed is only available for small coasting craft or boats. There are from 6 to 8 fathoms within 200 yards of the outer mole, but eastward of it the ground is foul. There is a mooring buoy in 39 feet of water in the entrance to the port.

Jetties.—Pontile della Magona, close westward of Punta della Batteria, has a depth of 8 feet at its head and 13 feet close outside. Close northwestward of this jetty is a similar one. Pontile della Ferriere, 400 yards from Punta della Batteria, has a depth of 10 feet at its head. Pontile degli Alti Forni, the northerly jetty, is about 370 yards long, with a short arm extending northward from about the middle; there is a depth of 11 feet at the head of this jetty, on which is a railroad, and near its root are some landing steps.

Telegraph.—A submarine telegraph cable is laid between Piombino and the island of Elba.

Supplies.—Meat can be obtained; in a large building between Alti Forni and Ferriere there is a cooperative store, where all kinds of provisions can be procured.

Communication.—There is a railroad from Piombino and Porto Vecchio to Campiglia, where it joins the line from Genoa to Rome; the station is near the root of Pontile degli Alti Forni. There is telegraphic communication.

Light.—A fixed red light, visible 5 miles and elevated 88 feet, is established on La Rocchetta, southward of Piombino Town. (See Light List.)

Piombino Channel, between Piombino Promontory and the island of Elba, is 5 miles broad at the western entrance; at the eastern it is narrowed to two-thirds that distance by the islets of Cerboli and Palmajola. The soundings are irregular; there are, however, from 18 to 25 fathoms through. Vessels may pass between either of the islands or between them and either the mainland or Elba, keeping in mid-channel; when passing through the Piombino Channel take care to avoid the shoal off the northeastern end of Palmajola Island.

Follonica Bay.—About $10\frac{1}{2}$ miles southeastward of Piombino is Cape Troja, the coast between forming a bay about 6 miles deep named Follonica Bay. The western shore is low and swampy, but toward the head of the bay is a fine forest backed by elevated ground; the eastern shore is bolder. Cape Martin is the rocky termination of a range of mountains extending to the northeastward, at the foot of which toward the village of Follonica are extensive marsh lands. The southeastern part of the bay between Capes Martin and Troja is a sandy beach, the land at the back of which is thickly wooded; about 1 mile southward of Cape Martin is Civette Tower at the mouth of Alma River.

Port Vecchio is a bight in the northwestern corner of Follonica Bay affording good shelter from westerly winds; there are a few cottages and two batteries on the western shore; near the northern battery is the landing place. The streams from the high land of Piombino and the drainage from the marshy country around enter the sea through a narrow cut named Cornia Canal; Sale Tower stands on the beach $2\frac{1}{2}$ miles to the eastward of the canal. At a distance of $\frac{1}{4}$ to $\frac{3}{4}$ mile southeastward of the landing place there are depths of from 5 to 8 fathoms, muddy bottom, but to the northeastward are banks having only 3 or 4 fathoms water on them.

Shoal—Beacon.—There is a least depth of about 3 feet over the $\frac{3}{4}$ -fathom shoal in the harbor of Vecchio di Piombino, located 1,200 yards 5° from the old semaphore. A large spar showing about 6 $\frac{1}{2}$ feet above water has been placed on the shoal.

Northward of Punta Della Batteria are five moles, the northern of which has railroad lines on it.

A branch line of railroad connects Piombino and Port Vecchio with the main line at Campiglia.

Lights.—Two fixed red lights, placed vertically, 10 feet apart, and visible from a distance of 5 miles, are exhibited from the head of the northern arm of the railroad mole about 800 yards northward of Punta della Batteria.

A fixed green light, elevated 31 feet above the sea, is shown from the head of the pier of the company, La Magona d'Italia, about 950 yards northward of the old semaphore.

Another green light, elevated 31 feet, about 16 yards from the first, is shown on the same pier while steamers are unloading.

Three large electric lights are occasionally shown above the Alti Forni, a good deal to the right of the lights of the town of Piombino. These lights are on the promontory, and may serve as a guide for vessels making for the anchorage of Port Vecchio.

A small fixed white light has been established by the Elba Railroad Co. on the end of the pier at Follonica.

The light is exhibited 16 feet above the water from an iron column 8 feet high and is visible 2 miles.

It will be placed under the control of the Italian Government and changed to an occulting white light with a red sector over Pino Shoal.

Follonica.—The village of Follonica is situated at the head of the bay 7 miles eastward of Sale Tower; midway on the beach is Mozza Tower; the village contains iron smelting works, a railroad station, and has a short pier, off which shoal water extends about 1,200 yards; on the heights above the town is an ancient fortress. Large quantities of charcoal are exported to Malta and coast ports.

The head of Follonica Bay is shallow, especially off Mozza Tower, and between it and the village, off which there is a depth of only $1\frac{1}{2}$ fathoms at nearly 1 mile from the shore, and there and elsewhere in the bay the coast should not be approached within 1 mile. About $1\frac{1}{2}$ miles northward of Cape Martin is a small group of cottages, northwestward of which there is anchorage in 8 to 9 fathoms water. Between Follonica and the cottages the country is a wooded swamp.

Batteria Point—Light.—A flashing red electric light is erected on Batteria Point.

The light is exhibited 64 feet above the sea from an iron candelabrum, painted red, on a square masonry base, standing on a stone terrace, 735 yards 14° from the old semaphore station at Piombino, and is visible 7 miles. (See Light List.)

Anchorage.—The roadstead of Follonica is exposed to southwest winds which, however, do not send in a heavy sea. The holding ground is good, the best position for a large vessels being in 5 fathoms, with the pier bearing about 25° and Torre Mozza 321° . Small vessels may anchor in 3 fathoms within $\frac{1}{4}$ mile of the pier.

Communication.—Follonica is on the line of railroad between Rome and Genoa, etc.

Supplies are plentiful, but water, though abundant, is of bad quality.

Cape Troja, the southeastern extremity of Follonica Bay, has a double point with a tower on each; the cape is elevated, but the land between it and the slopes of Mount Ballone is low, marshy, and wooded. Mount Ballone, the summit of which is 2,066 feet high, lies 7 miles eastward of the cape.

Troja Islet.—Off the cape are several islets and rocks, the outer and larger of which has a tower on it, and lies 1 mile 260° from the southern point of the cape; it is steep-to except on the southeastern side, and in the channel between it and the rocks off the cape is a depth of 6 fathoms. This passage, however, should not be attempted by strangers.

The coast.—From Cape Troja a bold shore extends southeastward 3 miles to Rocchetta Fort and Tower, thence curving southward to the mouth of Ombrone River, distant 13 miles; $\frac{1}{2}$ mile westward of Rocchetta is Galera Tower, and within the rocky point eastward of it is a small boat harbor.

Castiglione della Pescaja is situated 4 miles 102° from Rocchetta Fort, near the mouth of a canal which receives the Bruna River and drains the lake and marshy land in the vicinity; the town is partly inclosed by a wall connected with a castle on an eminence facing the shore.

The canal is entered between two short moles; it has a general depth of about 6 feet, but about 700 yards within it is crossed and closed by a bridge with three arches; the depths in the canal vary considerably, and boats of over 5 feet draft should only enter with a smooth sea.

Marze Tower is $1\frac{1}{4}$ miles 125° from Castiglione; it is partly built in the sea and near it is a shipping place for wood. Four miles beyond it is St. Rocco Tower, and between is a canal crossed by a wooden bridge; from St. Rocco the coast trends south to Ombrone River. The shores of the bay are low and wooded, fronting a large extent of low marshy land; they are steep-to, there being a depth of 5 fathoms $\frac{1}{2}$ mile from the beach in the northern part of the bay; the southern part toward the mouth of Ombrone River should not be approached nearer than 1 mile.

Lights.—An occulting green light, visible 5 miles, is exhibited from a hut on the outer end of the South Mole.

A fixed red electric light is erected near the root of the Northern Mole. (See Light List.)

Ombrone River, having its outlet through a low projecting wooded point, on both sides of which are small lakes, flows in a

southwesterly direction, and is only navigable for boats. Half a mile out the water is very shallow. Off the mouth of the river are ruins and remains of ancient constructions; and the land being very low, the point must at all times be cautiously approached. A good road leads to the walled town of Grosseto $8\frac{1}{2}$ miles distant; Grosseto, containing a population of about 7,300, has a fine cathedral and a railroad station. At the junction of two roads, $2\frac{1}{2}$ miles from the river's mouth, is Fort Trappola.

Forno Cove.—The sandy coast continues for 3 miles to the eastward of the mouth of the Ombrone as far as an old square tower nearly in ruins, which stands on a cliff; here the coast becomes rocky and hills border the shore. Forno Cove is $1\frac{1}{2}$ miles from the tower, and is formed by a bight, about 200 yards in depth running southeast, and sheltered from the westward by a rocky point on which is a tall square tower; at the entrance there are 5 fathoms gradually shoaling to a sandy beach at the upper part. There is a customhouse and pratique office, and fresh water is procurable. Off the shore between the cove and Ombrone River shallow water extends $\frac{1}{2}$ mile out, but from the cove southward, the coast is bold until near Cape d'Uomo; a small rock lies a short distance southwestward of the tower.

On the wooded heights above, northward of Forno, are the conspicuous towers of a convent.

Canella Tower stands on a point 2 miles southward of Forno Cove; it is white and square, and there is deep water close to the point. Cape d'Uomo, about 2 miles farther southward, has a conspicuous round tower on it; hence a rocky but tolerably bold shore continues to the western point of Talamone Bay; for some distance northward of this point shallow water extends 400 yards from the shore.

Talamone consists of a few houses and a castle situated on the last-mentioned point and is surrounded by a wall; the castle is a high building facing the southwest. Talamone Bay lies eastward of the point; on the eastern shore is a ruined castle and tower, and the beach on that side should not be approached nearer than 400 yards, as off it the water is very shallow. Small vessels which resort here to load with charcoal (quantities of which are shipped) and sulphur, anchor in 3 or 4 fathoms, but the anchorage off Talamone is much exposed. A small shoal, with $4\frac{1}{2}$ fathoms on it, lies on Talamone Bay with the lighthouse bearing 297° , distant 800 yards.

Buoys.—Two red cylindrical mooring buoys lie about 400 yards northeastward of the tower, and are used by steamers when loading with minerals.

Light.—A flashing white light, elevated 72 feet above the sea and visible 8 miles, is exhibited from a masonry shrine, 36 feet in height.

situated on the extremity of Talamone Castle wall. (For arc of visibility, see Light List.)

Anchorage may be had anywhere in the bay, taking care to avoid the submarine cable, the best position being close to Talamone Point.

Fortified port.—Talamone, including the coast from Fiume Ombrone to Porto Ercole, is a fortified port. (See Regulations.)

Telegraph cable.—A cable is laid to Caprera Island; the point where it is landed in Talamone Bay is near the fort; the position is marked by beacons and notice board. Anchoring, fishing, or any other operation which might damage the cable is prohibited.

The line of the beacons always indicates the direction of the first portion of the cable.

Salines.—From Talamone $6\frac{1}{2}$ miles 195° is Lividonia Point, the coast between forming a deep bay the shores of which, excepting on the southern side, are low and wooded. The depths are regular over the bay decreasing gradually toward the beach, which, however, should not be approached within 1 mile where there are depths of from 7 to 9 fathoms. In the middle of the bay, about $\frac{1}{2}$ mile from the beach, is Salines Tower.

Albegna River, the entrance of which is close to Salines Tower, is navigable for boats for about 2 miles from its mouth. The river is shoal off the entrance, there being only about 3 feet water over the bar. When entering leave a stake on the shoal point on the starboard hand.

A short distance southward of the river a large lake, which is separated from the sea by only a narrow neck of land, extends 4 miles to the southward.

Mount Argentario is the summit of a bold promontory $6\frac{1}{2}$ miles long (in a north-northwestward and south-southeastward direction) and 4 miles broad, attaining an elevation of 2,083 feet. This mass of high land is joined to the main by narrow necks of low wooded land inclosing extensive lakes, and when seen at a great distance it appears like an island. The coast is rugged and broken into several small bays, on the points between which are several towers.

Semaphore.—A semaphore signal station and electric telegraph is situated on the Torre de Cala Grande, on the western side of the promontory, at an elevation of 347 feet above the sea.

Porto Santo Stefano.—Punta della Madonnetta lies 1 mile west-northwestward of Punta Nera, and Porto Santo Stefano extends about 800 yards southward between them, forming two bights. The town is on a small projection between the bights, and there is a little old square fort behind it; there are houses around the bights; the campanile of the church is square and yellow in color. Molo Acetina extends about 60 yards northeastward from the eastern side of the town, and is being lengthened 40 yards; there are two quays which

form a basin for fishing boats at the head of the east bight. A mole extends 40 yards eastward from the health office, which is on the north point of the west bight, and a quay borders the shore southward of it.

Tunny fishery.—Tunny nets extend 164 yards from the shore in an east-northeastward direction, to the eastward of Calvello Tower.

Supplies can be obtained from Orbotello, and water can be procured here from two fountains.

Lightbuoy.—A lightbuoy, showing a fixed white light, marks the works for extending the mole to the southeastward of Santo Stefano, and is moved outward as the works progress. Vessels should not pass within a distance of 130 feet from this buoy, nor between it and the head of the mole. If the light of the buoy is extinguished, vessels should give the fixed green light on the mole-head a berth of at least 200 yards.

Buoys.—A yellow iron mooring buoy lies about 250 yards northward of the east point of the east bight. A yellow cylindrical iron mooring buoy lies about 200 yards northeastward of the health office; a red iron mooring buoy and a yellow iron mooring buoy lie southward of the health office mole.

Lights.—On Lividonia Point, Santo Stefano, is a white cylindrical tower at the corner of a two-storied dwelling, 23 feet high, from which, at an elevation of 108 feet above the sea, is exhibited an occulting white light, visible 8 miles.

From the extremity of the mole extending seaward from the health office at Santo Stefano, at an elevation of 18 feet above the sea, is exhibited an occulting green light visible 4 miles; shown from an iron frame on masonry base, 16 feet in height.

A fixed green light is shown from the extremity of the mole in course of construction, and is moved outward as the works progress. (See Light List.)

Anchorage.—Large vessels may anchor off Santo Stefano, but the holding ground is not good and the anchorage is much exposed to northwest and northerly gales, but affords shelter to southeast and southerly gales.

Argentarola Islet is about 2 miles 215° from Lividonia Point and 250 yards offshore; in the channel between is a depth of 28 fathoms. Southward of the islet, about $\frac{3}{4}$ mile, is Bove Point, on which is Cala piatti Tower, and about 700 yards 215° from the tower is a shoal and rock awash. With this exception the shores of the promontory are bold-to, there being 16 and 18 fathoms at 300 yards from the cliff. Three-quarters of a mile south-southeastward of Cala piatti Tower is the Torre d'Uomo, southwestward of which is Rossa Islet. Between Rossa Islet and Ciana Tower $1\frac{1}{2}$ miles 136°

is a bay in the center of which is Cannelle Tower, near which the telegraph cables from Sardinia and Giglio are landed.

Telegraph cable.—The cable to Giglio is landed near the Sardinia cable house; its direction is marked by two beacons, the front beacon with the notice board is attached to a house northward of the Orbetello-Sardinia cable house.

Caution.—Anchorage in the vicinity of the telegraph cables is prohibited; the landing places are marked by beacons with balls and notice boards.

Avoltore Point, the southern point of the promontory, has a tower on it. Nearly $1\frac{1}{2}$ miles 52° from Avoltore Point is Isolotto, a tolerably high islet about 500 yards offshore; in the channel between it and the shore are $3\frac{1}{2}$ fathoms, rocky bottom.

Port Ercole or Hercules is a small port on the eastern side of the promontory; the entrance, which is about $\frac{1}{2}$ mile wide, lies between two high points, on the northern of which is Fort Philip and on the southern Fort Rocca; the latter stands over the town, which is built on the steep side of the hill and is inclosed between two walls, having a bastion at the eastern angle named Santa Barbara.

At the entrance to the port are depths of 7 and 8 fathoms; off the pratique office and a fishing village farther northward, shoal water extends some distance offshore. A shoal on which is $2\frac{1}{2}$ fathoms water having 8 fathoms round it lies 300 yards off St. Catherines Point; from it Fort Philip bears about 280° ; the fairway into the port is southward of the shoal. Small vessels anchor off the town in from $1\frac{1}{2}$ to 3 fathoms, weedy bottom. With southeasterly winds a heavy swell is thrown into the port. Porto Ercole is a fortified port.

New groin.—A masonry groin has been constructed at Port Ercole, commencing at a point on the shore 820 yards $304^\circ 30'$ from the lighthouse on Fort Rocca and extending 43 yards 91° .

Tunny fishery.—Tunny nets are laid in an easterly direction, 100 yards from the shore between it and Santa Caterina Shoal.

Water.—There is a fountain near the town, from whence water may be obtained.

Supplies.—Provisions are scarce, but could be obtained at Orbetello.

Communication.—There is a mail service daily to Orbetello railroad station, distant $4\frac{1}{2}$ miles, and also telegraphic communication.

Lights.—At the northeast bastion of Rocca Fort, Port Ercole, is a circular gray tower 62 feet in height, from which at an elevation of 300 feet above the sea an occulting white light is exhibited, which is visible 24 miles. Partly obscured. (See Light List.)

From a lantern on a red stone pillar on the north bastion of Santa Barbara Battery a fixed red light is exhibited, elevated 43 feet above the sea, and visible 4 miles.

A fixed green light, visible 3 miles, is erected on the head of the new groin, 820 yards $304^{\circ} 30'$ from Fort Rocca Lighthouse.

The light is exhibited 13 feet above the sea from an iron post 10 feet high. (See Light List.)

Orbetello is a fortified town situated between two lakes of the same name which nearly occupy all the lowland between the promontory of Argentario and the hills 3 miles eastward of it. At the foot of the promontory the two lakes, which are nearly united, are $2\frac{1}{2}$ miles across; the eastern side, between Salines and Ansedonia, is nearly 6 miles in length. These salt lakes are about 7 and 8 feet deep and abound in eels and other fish. In the southwestern corner a narrow outlet communicates with the sea. Orbetello has a population of 4,800, and near it are the ruins of ancient Cosa.

Ansedonia Point lies $3\frac{1}{2}$ miles from Port Ercole, the intermediate coast forming an open bay, the shore of which is a sandy beach fronting a wooded strip of lowland, on the northern side of which is Lake Orbetello. A depth of 5 fathoms is found at about $\frac{1}{2}$ mile offshore; the point is a moderately high bluff with steep and rocky sides, having a rounded hill within on which are some ruins; a tower in ruins stands on a point to the southeast, another in a bight on lowland within, and to the westward is a third standing in a battery near the water. There is deep water surrounding the point and towers at a short distance off.

Formico di Burano, a small rock about 12 feet above water, lies 2 miles 142° from Ansedonia Point, and $4\frac{1}{2}$ miles 103° from Port Ercole; shallow water extends a short distance off its northeastern and southwestern ends, and there are depths of 10 and 12 fathoms at $\frac{1}{4}$ mile from it on all sides.

The coast.—From Ansedonia Point a low sandy and wooded coast curves eastward and southward 35 miles to Cape Linaro, and may be approached anywhere within 1 mile. Buranaccio Tower stands on the beach 4 miles eastward of Ansedonia Point; a salt lake extends from near the latter point to $1\frac{1}{2}$ miles eastward of the tower and runs nearly parallel with the coast, from which it is less than 1 mile distant; it is 5 miles long and about $\frac{1}{4}$ mile broad. Montalto Tower is a low square building near which are a few houses. About 200 yards northward of the tower is the entrance to the Fiora River, navigable for boats for a short distance. The railroad from Civita Vecchia crosses the river here.

On a hill about $1\frac{1}{2}$ miles from the mouth of the river is the small town of Montalto.

Morelle or Danger Point, $1\frac{1}{2}$ miles to the southeastward of Montalto Tower, is a low point off which rocks and shallow water extend

$\frac{1}{2}$ mile; a short distance southward of the point is an inlet where boats may obtain shelter.

Shoal to southward.—A shoal with a least depth of 22 feet over it lies about $1\frac{1}{2}$ miles southward of Montalto Tower, on the bearings: Montalto Tower, 10° ; Trincere Tower, 123° .

Nine miles from Montalto Tower are large salt works on which convicts are employed, and near the convict establishment are a boat camber and short pier. On the Italian chart this is called Porto Clementino.

On a hill about 3 miles northeastward is the city of Corneto; its Gothic cathedral and several other towers and buildings render it conspicuous. Between Guaglia and Agostino Points, the coast forms a shallow bay where a river, which is navigable for boats for a distance of $2\frac{1}{2}$ miles, enters the sea. In the center of the bay, which affords shelter to none but small coasting vessels, is a shoal of $2\frac{3}{4}$ fathoms.

Water can be obtained from St. Augustin's well at the ruins of an old convent.

Civitavecchia (ancient Centum Cellæ) was the principal seaport of the late Roman States, and is strongly fortified. The principal buildings are a palace, cathedral, several churches, an arsenal, museum, aqueduct, and lazaretto, and the population is about 20,900.

At the town hospital seamen are kept and attended to, paying a fixed charge.

The port is formed by a curved mole (named the Bicchiere) extending about 820 feet in a northwest direction from Fort Michelangelo (on the southern side of the town), and by another on the northern side of the town extending about 560 feet toward the southwestward; on the latter is the lazaretto; both moles have circular forts on their outer ends. The Bicchiere Mole is to be lengthened 60 feet and widened to 250 feet.

Fronting the entrance between the above moles, which is about 230 yards wide, is a breakwater (Antemurale) 20 feet high, and 115 feet broad; on the northern end is Marzocco Fort.

This breakwater has been extended from Marzocco Fort in a 293° and 323° direction for a farther distance of about 470 yards, and from the southern end a breakwater has been constructed, which extends in a 133° direction 240 yards, 85° for 310 yards, and from thence 73° to the shore, thus closing the former south channel. An inner quay has been completed along this southern breakwater.

The channel between the breakwater and the Lazaretto Mole is about 150 yards wide, but the navigable part which has been dredged to a depth of 26 feet, is only 80 yards wide. The darsena or basin, about 5 acres in extent, is within the fortifications on the northern side of the harbor: it is entered by a narrow passage with 10 feet

of water, but within there is a depth of 20 feet over the greater part of it; it has been selected as one of the principal torpedo boat stations in the Kingdom and is used exclusively for naval purposes; the arsenal and health office are on the southeastern side of the port.

A small pier about 200 feet long, for the use of the Sardinian mail steamers, is in course of construction, extending in a west-northwest direction from the Health Office Pier. Moorings for torpedo boats have been laid down in the harbor.

Over the harbor dredging operations are in progress; the depths are from 19 to 26 feet.

In southwest gales, which frequently blow in the winter, the sea sweeps completely over the breakwater, causing vessels in the port to ride uneasily and renders the roadstead outside the breakwater a very unsafe anchorage at that season.

Vessels inside the breakwater anchor and secure astern to the breakwater. In bad weather this is not considered a safe berth. Hemp hawsers are recommended on account of the uneasy motion when there is any swell. Vessels should be provided with a double set; for although the authorities supply large hawsers gratuitously in cases of emergency, they expect payment for any damage.

Although much improvement has taken place in dredging, the harbor is still inadequate to accommodate more than six or seven steamers, many more having to wait outside at great risk. New quays are now under construction to facilitate and hasten the unloading of vessels.

Dredging.—While dredging is in progress in the outer port the dredger will be at its post only during the day. Owing to its system of mooring it will not be able to leave completely free the passage to vessels moving in that port, and it is necessary that in entering steamers should steer 115° , passing about 44 yards from the light at the head of the breakwater, and in the opposite direction when leaving. For sailing vessels, during the day, there will be a tug at their disposal, which will tow them gratuitously when entering and leaving the port.

Lights.—On the southeastern extremity of the Antemurale Breakwater, from a gray cylindrical tower, 105 feet in height, is exhibited, at an elevation of 122 feet, a flashing white group light, visible 16 miles.

An occulting green light, elevated 33 feet above the sea and visible 7 miles, is exhibited from a circular turret, standing about 52 feet from the northern extremity of the North Breakwater.

From a support on a square base, 10 feet in height, on the extremity of the mole extending northeastward from Marzocco Fort, a flashing green light is exhibited, at an elevation of 20 feet, visible 5 miles, except where obscured.

A flashing red light, elevated 19 feet above the sea and visible 9 miles, is exhibited from a masonry support at the extremity of Lazaretto Mole. (See Light List.)

Buoy.—A warping buoy has been established 50 yards southwestward of the health office.

Anchorage.—Vessels of heavy draft will find good anchorage in fine weather, about 500 yards outside the breakwater, with the northern extremity of Bicchiere Mole, in line with southern extremity of breakwater 55° , in 20 fathoms, stiff mud; vessels unable to enter may anchor in any convenient depth off either end of the breakwater, within $\frac{1}{2}$ mile of the harbor.

Vessels anchor inside the outer mole, and secure their sterns to the mole, but in bad weather this is not considered a safe berth; hemp hawsers are recommended on account of the motion when there is any swell, and a double set should be provided, for although the local authorities supply large hemp hawsers gratuitously in cases of emergency, any damage must be paid for.

In southwesterly gales, which are frequent in winter, the sea breaks completely over the outer mole and causes vessels in the port to ride uneasily; the anchorage outside the outer mole is unsafe at that season.

Pilots.—The pilot boats lie under the shelter of the outer mole, and in fine weather pilots board vessels at a distance of 4 miles from the port; in bad weather the pilot boats do not go out of harbor, and signals to that effect are made from the flagstaff at Torre del Bicchiere watch station. The pilots' lookout house is in Fortino del Marzocco and their office is on Principe Tommaso Quay.

Directions.—From a distance the locality of Civitavecchio will be recognized by the conspicuous city of Corneto on the elevated land 10 miles to the northward, and by the prominent point of Cape Linaro and its tower about 5 miles southward of the town; the tall chimney of the soap works at the northern extremity of the town is one of the most conspicuous objects, especially if there is any haze; on nearing the port the high lighthouse on the breakwater will soon be distinguished. When entering the port pass northward of the breakwater (occulting green light), and steer for the end of the Lazaretto Mole, keeping in the dredged channel of 26 feet. At night steer for the flashing red light on Lazaretto Mole, bearing about 114° , which will lead to the entrance of the dredged channel, until the flashing green light near Marzocco Fort is abeam, when haul in for the port, and when in the port anchor as convenient.

Trade.—The principal articles imported in 1911 were coal, fire bricks, grain, phosphates, pig iron, pitch, and timber; the chief exports were alum, coal, charcoal, staves, calcium carbide, and cheese.

Supplies.—Provisions are rather plentiful; drinking water is supplied in water boats.

Repairs.—Small repairs to vessels can be effected.

Coal.—No coal, patent fuel, or oil fuel is kept in stock at Civitavecchia. The consumers of practically all the coal imported are the State railroads and a Roman gas company.

Communication.—A railroad connects the port with Rome (distant $45\frac{1}{4}$ miles), Leghorn, Naples, and Terni (where there are large steel works), and a daily service of steamers to Capo Figari (Sardinia). A small steamer runs six times monthly from Genoa and Leghorn to Rome, and two steamers between Sicily, Naples, Civita Vecchia, and Rome. There is telegraphic communication.

A railroad is to be constructed giving direct communication with Terni, in the interior.

Signal station.—On Fosso Cupo, about $1\frac{1}{2}$ miles northward of the cape, is a semaphore tower, 466 feet above the level of the sea, and painted black and white in squares.

Quarantine.—Vessels with infection on board undergo quarantine at Asinari, Sardinia, where there is a lazaretto.

The coast—Cape Linaro.—From Civitavecchia a rocky coast, rising toward the south, trends for above 4 miles 153° to Cape Linaro; midway is the tower of Marangone. Shoal patches extend in some places $\frac{1}{2}$ mile off; the land should therefore not be approached nearer than 1 mile, at which distance there are from 15 to 20 fathoms. From Cape Linaro the coast curves to the east and south-southeastward for 28 miles to the mouths of the River Tiber; it is low and wooded, and for about half the distance is backed by hills of considerable elevation, their summits being from 3 to 4 miles inland; numerous streams run through the several valleys; none of them, however, are of any magnitude.

About $1\frac{1}{2}$ miles eastward of the cape are the village, church, and castle of St. Marinella, with a short mole extending to the eastward, affording shelter to small craft; between the village and the cape rocky patches extend nearly $\frac{1}{2}$ mile off the shore.

Nearly $5\frac{1}{2}$ miles southeastward of St. Marinella is Macchia Tonda Tower, situated near a stream; the village of St. Severa stands on the shore about 1 mile northward of it, and $4\frac{1}{2}$ miles 58° from the tower is Mount Santo, 1,411 feet in height. Flavia Tower stands on the low beach, 4 miles to the southeastward of Macchia Tonda Tower, and $2\frac{3}{4}$ miles farther to the southeastward is the village of Palo, having a small boat harbor; near it is an ancient castle. On a hill nearly 4 miles northward of Palo is the village of Cerveteri, the site of an ancient Etruscan city, the remains of which still exist.

Macchia Tonda Banks.—Off Macchia Tonda Tower rocky patches of from 3 to $4\frac{1}{4}$ fathoms, with from 6 to 10 fathoms between

them, extend nearly 2 miles from the shore, skirting the coast northward toward St. Marinella.

Flavia Banks.—Off Flavia Tower similar rocky patches extend quite 2 miles from the shore in a southwestern direction; between these patches and Macchia Tonda Banks are depths of 8 and 10 fathoms.

Palo Banks are rocky patches of from 3 to 5 fathoms extending $1\frac{1}{2}$ miles offshore from the village of Palo; between them and Flavia Banks are depths of from 6 to 8 fathoms.

Bato Banks, with $4\frac{1}{4}$ to $4\frac{3}{4}$ fathoms, lie $1\frac{1}{2}$ miles to the southward of Palo.

Caution.—The coast between Cape Linaro and the village of Palo should not be approached in vessels of heavy draft nearer than $2\frac{1}{2}$ miles.

Tiber River (ancient Tiberis), the Tevere of the Italians, rises in the Tuscan Apennines, 5 miles northward of Pieve-San-Stefano; it flows in a southern direction to within 3 miles of Rome, then turns to the west-southwestward, receiving many tributaries, and after a course of 185 miles it enters the Mediterranean about 17 miles below the city by two branches which inclose the wooded delta named Sacra Isola. Except in certain seasons of the year the river is sluggish, but in the spring it is subject to sudden and destructive freshets, the water sometimes rising from 20 to 30 feet above its usual level; it derives the name of "yellow Tiber" from the color of the deposit brought down by the stream.

Harbor works.—A small harbor is to be constructed at the entrance to the river and connected by electric tram with Rome. Two piers for a railroad bridge are being built, and the channel between them is marked by two buoys painted black and white in horizontal stripes. A stone bridge is being constructed to join Termini-Trastevere. About 131 yards of quay to the left of the new harbor under construction, below the said bridge, is finished and open for landing purposes.

Fiumicino Canal, the northern entrance to the Tiber, is the deepest of its two mouths, and is protected by piles which extend a short distance from the shore, and form two piers, the channel between, which is about 45 feet wide, increasing a short distance up, the general width of the canal being 145 feet. On the northern side, a little within the entrance, is a tower, near which are the health office and other buildings composing the village of Fiumicino, and nearly $\frac{1}{2}$ mile higher up is a swing bridge; near the junction of the canal with the main branch of the river is the village of Porto. Extensive ruins lie on the northern side of Fiumicino Canal in the vicinity of which can be traced the limits of the ancient ports of Claudius and Trajan.

The southern pier at the entrance to this canal has been extended about 100 yards.

Depths.—From 10 to 20 yards outside the piers at the entrance to the canal is a bar 300 yards in extent, on which are depths of from 8 to 10 feet water; inside the bar and for about $\frac{1}{2}$ mile up there are from 16 to 18 feet; beyond this the navigation of the river is obstructed by remains of old walls, piles, and trees buried in the mud. Small vessels, however, proceed some distance up, but most of the traffic with Rome is carried on in barges. The ordinary strength of the stream is from $1\frac{1}{2}$ to 2 knots an hour.

In the central part of Fiumicino Canal shoals of 1 and $1\frac{1}{2}$ fathoms are situated, necessitating great caution in navigation. In 1908 an Italian destroyer proceeded up the river to Rome, but was obliged to remain some time for sufficient water to return. On account of persistent floods the channel is (February, 1915) believed to have so altered as to be dangerous. It is proposed to deepen the Tiber to a depth of $8\frac{3}{4}$ feet.

Dredging.—Dredging operations are in progress in Canale di Fiumicino and Tiber River.

Current.—The current in Porto Canale is variable, and the greatest, but not extraordinary, rate is 7 knots. Issuing from Porto Canale the current generally turns gradually north-northwestward parallel to the coast.

As considerable overfalls are caused by the outgoing current from both mouths of the Tiber caution is necessary in boats, especially with winds from seaward.

The coast in the vicinity of the mouths of the Tiber is said to be extending westward.

Anchorage.—The 5-fathom curve is about 1 mile offshore, and the depth decreases gradually inside it; there is anchorage with offshore winds, in a convenient depth, stiff mud, and good holding ground, southward of the entrance to Porto Canale, so as not to be in the current.

Isola Sacra, between the mouths of the Tiber, is low, and covered with woods, but only partly cultivated.

Cape Due Rami to Rome—Buoyage.—Buoys numbered from 1 to 69, each cylindrical with conical topmark, mark the channel from Cape Due Rami to Rome. The starboard hand buoys have been painted black and the port hand buoys red with white numbers.

Caution.—Owing to exceptional freshets in the Tiber River in the spring of 1915, some of the pile work near and within the mouth of Porto Canale has given way, and the channel is obstructed in places.

Pilots.—Pilotage for all vessels over 11 tons net, except fishing vessels and vessels employed in coral fishing, either entering or leaving Porto Canale di Fiumicino, and in Tiber River. The pilots of

Porto Canale are under the authority of the minister of marine, and those of the river navigation under the *genio civile* of Rome. The jurisdiction of the Porto Canale pilots extends from the entrance to the swing bridge.

When weather conditions do not allow pilots to leave the port to pilot vessels arriving, a red flag will be hoisted on the pilots' hut. In that case vessels should not attempt to enter, pilotage being obligatory.

Signals.—Cape Due Rami is the north inner entrance point of the canal, and in its vicinity is a signal station which has telephonic communication with Fiumicino. A ball, upper half red and lower half white, hoisted at the signal staff, 33 feet high, indicates that Canale di Fiumicino is occupied by an ingoing vessel; vessels coming down the Tiber should then secure in the mooring berth immediately above Cape Due Rami; when the canal is clear the ball is hauled down.

For entrance into the channel port of Fiumicino, the following signals are hoisted on the mast on the pilots' tower, situated on the South Mole, near the side:

Signal.	Signification.
Red flag.....	With a calm sea, the depths are not sufficient to pass the bar, and with a rough sea entry is dangerous.
A flag with vertical blue bands at the ends and white in the middle with the letter "P."	Await the pilot; the passage of the channel is not free.

Fiume Grande, 2 miles southward of the Fiumicino Canal, is the wider of the two mouths. The entrance is, however, completely blocked up by sand banks which at 600 yards distance have only 1 foot water on them; inside the bar are depths of $1\frac{1}{2}$, 3, and in some places 5 fathoms. At 1 mile from the entrance is St. Michael's Tower, an octagonal building used as a lighthouse, and 3 miles farther on is the junction with the Fiumicino Canal.

Dredging.—Dredging operations are now in progress in Fiumicino Channel, and vessels must conform to the undermentioned regulations:

Regulations.—1. All steamers wishing to pass the dredger must ask for a clear passage by means of a whistle. This whistle must be answered from the dredger, which will then allow such passage as will not interfere with the carrying on of the work.

2. The dredger, when at work, will carry a ball at the masthead, and the channel must not be considered to be clear until the ball has been lowered.

3. Vessels, when passing the dredger, should maintain a moderate speed relatively to the current in the river.

4. During the night the dredger, if in the channel, will show the regulation lights, and haul in, as far as possible, toward the river bank.

5. Should the dredger be moored across the river by hawsers or chains a red flag by day and a red light by night will be shown on the side on which the channel is blocked.

6. In case of fog, the regulation signals will be made from the dredger by means of a whistle and bell.

Lights.—The light on St. Michael's (S. Michele) Tower has been discontinued.

From a white tower surmounting a white house, the whole 197 feet high, on Isola Sacra, about $1\frac{1}{2}$ miles 271° from San Michele Tower, a flashing white light with red sector is exhibited 41 feet above the sea.

The red light is visible 7 miles and the white 12 miles. The red sector marks the shoals recently formed at the mouth of the river.

At 38 yards from the extremity of the North Pier at the Fiumicino a fixed red light is exhibited from an iron pillar, at an elevation of 28 feet above the sea, visible 5 miles.

Sheers used in connection with an extension of the North Mole partially obscure the fixed red light.

At 110 yards from the extremity of the South Pier a fixed white light is exhibited from an iron pillar, at an elevation of 28 feet, visible 7 miles. These lights are only visible in the direction for entering the port.

The white light on South Pier is 137 yards from the extremity.

A fixed green light, elevated 10 feet, is shown from the head of the South Pier; it can not be shown in bad weather. (See Light List.)

Anchorage.—With favorable winds and in the summer season anchorage may be taken up about 3 to 5 miles west-northwestward of St. Michael's Tower in from 6 to 11 fathoms, stiff mud, and good holding ground. As the outset of the current often creates considerable overfalls at the mouth of the Tiber, boats should approach with caution, especially with the wind from seaward.

Ostia lies about $3\frac{1}{2}$ miles 69° from the south entrance of the Tiber, and is situated on the left bank of a former bend of the river's course, $\frac{1}{2}$ mile to the eastward of the present stream; near it are a tower and cathedral. Westward and nearer the river are the extensive ruins of the ancient city and Roman port of Ostium, founded 634 B. C.; the artificial works of the port, constructed by Claudius, are said to have covered a space of 130 acres; it was early abandoned, as was also that of Trajan, built half a century later, in consequence of the rapid alluvial deposit, and the port transferred to the open coast of the Civitavecchia. The deposit from the river is reported

still to be extending the shore westward at the rate of several feet annually.

Rome is about 13 miles by road from the Fiumicino. This famous city, once the capital of the Roman Empire and of the world, and subsequently that of the States of the Church under the sovereign Pontiff, has, since 1870, been annexed to Italy and again become its capital. Besides innumerable relics of antiquity it contains upward of 350 churches, and in 1914 a population of 576,435. The Tiber is crossed by seven bridges, one of which is a suspension bridge, and the river above is navigated by passenger steamers. Railroads connect Rome with Florence, Ancona, Civitavecchia, Port Anzio, and Naples.

The towns and villages near Rome have now a regular electric tramway service.

Consul.—The United States is represented by a consul and vice consul.

The coast.—From the Fiume Grande a low, sandy, and nearly straight coast trends south-southeastward 25 miles to Port Anzio; the land at the back is of moderate elevation and thickly wooded. At about 14 miles from the coast are the Alban Mountains, a remarkable group, the summit of which, Mount Cavo, is 3,114 feet high, just below the summit are two lakes, craters of an extinct volcano. Vajanica Tower stands on the beach 12 miles from the Tiber, and about 2 miles northward of it are the ruins of a palace. On the hills $2\frac{1}{4}$ miles to the eastward of the palace are the village and tower of Pratica.

San Lorenzo Tower stands on the beach 6 miles southward of Vajanica; a belt of brushwood borders the sandy beach, and within, the land is marshy and interspersed with large clumps of trees. At 2 miles southward of the tower, clay cliffs commence and continue as far as Port Anzio, over which at $4\frac{1}{4}$ miles from San Lorenzo is the round white tower of Caldara.

Port Anzio (ancient Antium), also called Port Innocent XII, lies $\frac{1}{2}$ mile eastward of Anzio Point, and is formed by a mole projecting about 400 yards from the shore in a southerly direction and then bending eastward for half that distance and again to the south-eastward 200 yards, inclosing depths of from 7 to 21 feet water with a sandy bottom. The port is defended by a fort on the mole and a battery on the north shore; off the latter are ruins of an ancient mole, and similar remains are scattered over the west side of the harbor, extending nearly 600 yards southward of the angle of the mole, formerly inclosing the ancient port of Nero.

The town, containing a population of about 2,000, is small and chiefly inhabited by fishermen, but it is becoming a bathing place. There are four villas or palaces; one $\frac{3}{4}$ mile northeastward of the vil-

lage, is the first building seen when standing in for the port. The trade consists chiefly of corn, timber, staves, and charcoal.

The Hospital di Frate Orsenigo, a long building surmounted by an aero motor, is conspicuous.

Rocks and shoal water extend over $\frac{1}{2}$ mile off Anzio Point, and between it and Caldara Tower (northward) upward of 800 yards off-shore; vessels therefore should not approach the coast between the above tower and the port nearer than 1 mile.

Harbor works.—Innocenziano Mole is being extended.

Mole constructed.—A masonry mole has been built at Port Anzio. The mole extends 75 yards 120° from a point located 610 yards 314° from the light on the head of the breakwater.

Beacon.—A post 16 feet high, surmounted by a black open triangle, stands on the shore of Port Anzio, about 766 yards 332° from the light on the mole. It is in the alignment of the two outer buoys. The beacon is painted black and white in horizontal bands.

Buoys.—Three buoys mark the deepest water into Port Anzio; the two outer are black conical; the inner is a white warping buoy.

A red bell buoy marked "Anzio" is moored at about 175 yards 79° from the light at the head of Innocenziano Mole.

Vessels entering the port should leave the red bell buoy on the port hand and steer for the white warping buoy, leaving the outer and inner black buoys on the starboard hand. Dependence should not be placed on the buoys being in position.

Lights.—On Anzio Point, at about 700 yards westward of the mole, is a circular tower, painted white and red in horizontal bands, from which, at an elevation of 92 feet above the sea, an occulting white light is exhibited.

From an iron post situated at the outer extremity of Innocenziano Mole a flashing red light is shown, elevated 35 feet above the sea, visible 6 miles. The mole is being extended. (See Light List.)

Shoal reported.—A shoal, awash, lies southward of the entrance to the old Port Nero, 600 yards 225° from the light on the molehead.

Caution is necessary in entering the port owing to the changes which occur in the depths at the entrance.

Inquiry should be made from the port office before entering, and entry should not be made when the sea is heavy.

Pilots.—There are no licensed pilots. When possible a seaman of the port will direct a vessel from a boat or from the head of Molo Innocenziano, but he does not go on board; the service is gratuitous.

Anchorage can be obtained about $\frac{1}{2}$ mile southeastward of the head of Molo Innocenziano, in $5\frac{1}{2}$ fathoms, sand, but it is very open, and should only be used temporarily and in fine weather.

Water can be obtained from a fountain in the angle between Moli Neroniano and Innocenziano. There is a small tank boat.

Communication.—There is a railroad to Rome and to Nettuno; there is also telegraphic communication.

Life-saving station.—A station for affording assistance in case of shipwreck is maintained at the port.

Semaphore.—A semaphore signal station is established on Anzio Point, about 400 yards to the north-northwestward of the light-house.

Nettuno.—The town of Nettuno, so called from the ruins of the ancient temple of Neptune, lies $1\frac{1}{2}$ miles eastward of Port Anzio, with which it is connected by a good road. There is also a line of railroad to Rome, from Anzio and Nettuno.

Astura.—A low coast, on which are sandy hummocks, trends southeastward for $5\frac{1}{2}$ miles to the small village and tower of Astura. The ruins of a fortress anciently known as *insulæ Asturæ* is connected to the mainland by a bridge; a reef extends from it about 400 yards in a southeast direction, but there are 5 fathoms water at a little more than $\frac{1}{4}$ mile off. Eastward of the tower is the mouth of the Astura River, which rises in the Alban Mountains.

The coast.—From Astura a low sandy beach, behind which is a chain of narrow lakes, trends to the southeastward to Cape Circeo, distant $16\frac{1}{2}$ miles. The country between the Alban Mountains and Mount Circeo is a swampy plain known as the Pontine Marshes. On the shore are the towers of Foce Verde and Fogliano, and at the termination of the sandy beach under Mount Circeo is the ancient port of Circe. Between Astura and Circeo the coast should not be approached nearer than 1 mile.

On the coast are three towers: Torre Paolo, on the northwestern side, and Torre del Fico, on the southeastern side, are circular, high, whitish, and conspicuous; Torre Vittoria, on the beach eastward of the mount, is square with windows.

A submerged old jetty extends about 200 yards westward of the vicinity of Torre Paola. A bank with $2\frac{1}{2}$ fathoms and less water extends about $\frac{3}{4}$ mile southeastward of Torre Vittoria.

Mount Circeo is a lofty isolated mass with a rocky uneven summit rising immediately over the sea and forming a conspicuous headland $3\frac{1}{2}$ miles in length; near the summit (1,775 feet above the sea) are the ruins of the temple of Circe. Situated at the southern extremity of the Pontine marshes, Mount Circeo, when seen from a distance, has the appearance of an island.

Telegraph cable.—The cable from Ponza Island is landed close eastward of Torre del Fico; two beacons mark its direction, with the usual notice regarding prohibited anchorage.

Light.—From a circular white tower in Cervia Battery, Fico Point, Cape Circeo, at an elevation of 125 feet above the sea, an

occuluting white light is exhibited, which is visible 17 miles. (See Light List.)

Ponza Islands.—**Palmarola**, the most western of the group, lies $19\frac{1}{4}$ miles 207° from Mount Circeo; it is $1\frac{1}{2}$ miles in length, in a north and south direction, and about $\frac{1}{2}$ mile wide at its broadest part. The island is high, steep, and nearly inaccessible, except in the center, where there is a remarkable break, the two elevated portions, 771 and 860 feet high, being connected by a low sandy beach.

The landing place is an open sandy beach about the middle of the western side of the island; **Palmarola** is, however, only frequented for bushwood, with which it is thickly covered.

Galere Rocks lie a short distance off **Sconcillo**, the northwestern point of the island, and off the western shore are several others, high and steep-to.

Fratelli Islets, four in number and nearly 500 feet high, lie off the southwestern point, and from these a reef extends $\frac{1}{4}$ mile to the southwestward; and a sunken rock with 12 feet over it lies about the same distance off, but rather southward.

Zirri Rock, another sunken rock with 3 feet on it, lies 700 yards 148° from the southeastern point of the island.

Mezzogiorno Bank, about 1 mile westward of the **Fratelli**, is a rocky patch of 8 fathoms; except in this direction, from 15 to 20 fathoms are found at $\frac{1}{2}$ mile from the shore.

Ponza Island, the largest of the group, lies nearly 4 miles 109° from **Palmarola**; it is high, uneven and irregular outline, being $4\frac{1}{2}$ miles in length and varying from 300 yards to a mile in breadth.

The high southern end of the island terminating in **Guardia Point**, slopes on the northern side to a narrow ridge of rock which separates **Luna Bay** on the west, from **Port Ponza** on the east; this ridge has been artificially perforated, and was part of an aqueduct of considerable extent for the supply of water to the town in the time of the Romans. In **Luna Bay** there is a depth of 4 fathoms at 300 yards from the beach and **Guardia Point**, on which is a lighthouse, can be boldly approached.

Semaphore.—On the highest part of the island (over the southern point) is an electric telegraph semaphore 915 feet above the sea.

Gavi Islet, off the northern end of the island and separated from it by only a boat passage, is high and steep on all sides.

Papa Point, at the northern side of the island, and on which is a fort, is $1\frac{1}{2}$ miles from **Gavi Islet**; there is a sandy bay on the southern side of the point and a watering place not far from it.

Faraglioni Rocks.—The **Faraglioni Rocks**, some of which are high, lie $1\frac{1}{2}$ miles southward of **Papa Point**, and the shore continues foul to **Bianco Point** 1 mile to the southward. About 600 yards 249°

of the outer Faraglioni Rock is Mattoni Shoal, of 7 feet with deep water around it and 11 fathoms between it and the rocks.

Formiche Rocks, lying 69° $1\frac{1}{4}$ miles from Guardia Point, are about 400 yards in extent, with deep water all around. To pass eastward of them the light tower on Madonna Hill (the southern point of entrance to Port Ponza) should not be brought to the northward of 300° ; and to pass southward of the rocks do not bring Guardia Light to bear to the southward of 266° .

Port Ponza is a bay on the southeastern side of the island about 600 yards wide, nearly $\frac{1}{2}$ mile deep, and open to the eastward. Near the southern entrance point are Madonna Islets; they are nearly connected and are high and bold-to. At 200 yards northeastward of the point is Rosso Island, equally steep; in the channel between are depths of from 8 to 10 fathoms. On the northern side of the entrance is Ravia Island (on which is a fort) about 200 yards offshore, to which it is connected by a reef; two rocky patches (Ravia Rocks) of 13 feet lie eastward 100 and 150 yards distant: between them and Ravia Island is a depth of 7 fathoms.

The town, containing a population of about 3,200, is situated on the southern side of the bay. There is a government house and penal establishment, and the inhabitants of the island are chiefly engaged in salt works and fisheries, and in the valleys corn and various fruits are cultivated. Many of the poorer people reside in the ancient excavations and caves. Those within Madonna Islets being called the "pilot's baths." The island was originally colonized by the Phœnicians and in later times by hardy and industrious people from Torre del Greco. Under the Romans the Ponza Islands were used as places of exile.

A mole extends 160 yards 279° from the town, $\frac{1}{4}$ mile within the entrance of the bay; inside the mole are depths of $3\frac{1}{2}$ to $2\frac{1}{4}$ fathoms, but the accommodation is limited in space. Outside of the mole is a breakwater extending about 130 yards in the same direction.

There is a depth of 16 fathoms at the entrance to the bay, shoaling gradually to a sandy beach at the head at a little more than 200 yards from which is a depth of 18 feet. About 200 yards 328° from the mole are depths of 4 and $4\frac{1}{2}$ fathoms, and there are from 12 to 18 feet water alongside the quays.

On a point about $\frac{3}{4}$ mile northward of the port is Fort Frontone, standing on a high position with steep walls on the land side. About $\frac{3}{4}$ mile northward of this is a cove whence water may be procured; it can be readily approached by boats in favorable weather.

Lights—Guardia Point.—A flashing white light, elevated 370 feet above the sea and visible 25 miles, is exhibited from a red octagonal tower above yellow dwelling, 58 feet high, situated on

Guardia Point, the southern point of Ponza Island. (For arcs of visibility and obscuration see Light List.)

Madonna Point Light.—A fixed red light, visible 5 miles, has been established on a hut at the foot of Guardia Point Light Tower.

The light is elevated 315 feet above the sea and shows over an arc of 30° , covering Formiche Rocks.

An occulting light is erected, 27 feet above the ground and 184 feet above the sea, on a hut at the foot of Madonna Point Light Tower. This light shows over an arc of 40° , covering Formiche Rocks. (For arc of visibility see Light List.)

Anchorage.—Anchor in the area included between a line drawn from Rotonda della Madonna Lighthouse to Scoglio Ravia, and from the Mole Lighthouse to the middle of Spiaggia di Santa Maria, in from 6 to 11 fathoms, mud. A small vessel can moor inside the mole.

Telegraph cables.—Cables from Monte Circeo and Isola Ventotene are landed on Spiaggia di Santa Maria, and two beacons in line mark their direction. Anchorage is prohibited in their vicinity.

Communication.—Steamers run twice a week between Naples and Ponza, calling at Ventotene Island.

Supplies in moderate quantities may be procured. In the summer and dry season the water is neither good nor plentiful at the town, but on the north side of the bay it can be obtained from tanks; and in the cove before mentioned, which lies about $1\frac{1}{2}$ miles to the northward of the bay, an abundant supply can be procured.

Directions.—The worst winds affecting the anchorage are those from the northeast and eastward; squalls from the northwest also come heavily down the valleys. The best berth for a large vessel is in about the middle of the bay in 9 to 11 fathoms water; if intending to moor, have open hawse to the eastward; should it come on to blow, a vessel of moderate size could haul in under the shelter of the mole and secure to it.

Entering the bay from the northward, Ravia Rocks will be cleared by keeping the western extremity of Rosso Island in range with the eastern extremity of Madonna Islets until the mole head (or light) bears 230° , when a vessel may steer for the anchorage.

The port is much frequented by vessels seeking shelter from contrary winds.

Tide.—A rise and fall of from 2 to 3 feet has been observed.

Zannone Island, nearly $2\frac{1}{4}$ miles northeastward of Isolotto di Gavi, is about $\frac{3}{4}$ mile long east and west and nearly $\frac{1}{2}$ mile broad, the shore being steep, with deep water close to. The highest part (604 feet above the sea) is on the northern side, whence the island slopes gradually toward the opposite direction; it is covered with small wood, and affords pasture to a few sheep and goats.

Landing can be effected either eastward or westward of Cape Nero, or at Il Varo on the south coast, whence footpaths lead to the lighthouse.

Mariolo and Varo Rocks.—The north side of the island is foul within 300 yards of the shore. On the west side is a small islet, about 2 feet above water, 200 yards outside which is Mariolo Rock with 12 feet on it; $\frac{1}{2}$ mile to the southward is Varo Rock, with 8 feet water over it; a patch of $6\frac{1}{2}$ fathoms lies with Mariolo Rock bearing 25° , 1,200 yards.

When passing between Ponza and Zannone keep closer to Grosso than Zannone to avoid Varo Rock.

Light.—From a yellow octagonal lighthouse situated on Cape Nero (northward point of Zannone Island), is exhibited at an elevation of 125 feet above the sea, a flashing white light. The light should be visible in clear weather from a distance of 15 miles. It is obscured by Palmarola Island. (For arc of visibility see Light List.)

Grosso, Piana, and Scoglietello.—In the channel between Ponza and Zannone the depths are very irregular. Three small islets, named Grozzo, Piana, and Scoglietello, lie nearly in a line between; the former, about 12 feet above the sea, is $1\frac{1}{2}$ miles from Zannone and a little more than 1 mile from Gavi Islet, and is steep to all around; Piana, about 6 feet in height, lies $\frac{1}{2}$ mile 238° from Grosso, in the channel between which is a depth of 19 fathoms; Scoglietello (composed of several rocky heads which appear above water) lies $\frac{1}{2}$ mile from Piana and about $\frac{1}{4}$ mile from Gavi Islet; between them and the former is a depth of 16 fathoms, and in the channel between them and the latter are 14 fathoms water.

Shoals.—A rocky shoal with 26 feet over it lies eastward of Gavi Island, with Piana Rock bearing 30° distant 1,200 yards. Another patch of 9 fathoms lies with Piana Rock bearing 103° distant 800 yards.

Botte Rock lies $7\frac{1}{4}$ miles 109° from the southern point of Ponza, and $8\frac{1}{4}$ miles 165° from the summit of Zannone; it is 65 feet above the sea and is steep to on all sides, there being 50 fathoms within $\frac{1}{4}$ mile of it.

Ventotene Island (ancient Pandaria), the highest part of which (Arco Point, the southwestern extremity) lies $14\frac{1}{4}$ miles 103° from Botte Rock, is $1\frac{1}{2}$ miles long, and from 300 yards to $\frac{1}{2}$ mile broad; it has an irregular outline, and slopes from an elevation of 456 feet (at Arco Point) down to the low ground about Port Nicolo on the northeast. The island is well cultivated and the inhabitants of the small town of Port Nicolo are principally fishermen.

Off the northwestern side of the island reefs of rocks, some of which are above water, extend 600 yards offshore, they are named the Sconcglio, and one will readily be distinguished from its size; a sunken rock lies about 200 yards off Arco Point, the southern shore of the island is foul at 300 yards off, a patch of 26 feet lies with the prison on San Stefano Island bearing 75° , distant 1,850 yards; the other parts of the coast are tolerably bold, and the island generally is, except at the port, unapproachable to boats.

Telegraph cable.—The cable to Ponza Port is landed on the west coast, 800 yards southwestward of Nevola Point, in Pareta Grande Bay; its direction is marked by two beacons in range with the usual notice board attached. The cable is laid 268° for 600 yards, thence 291° .

Light.—An occulting white light, elevated 59 feet above the sea and visible 13 miles, is exhibited from a shed and iron support, 26 feet in height, situated on the southern side of entrance to Port Nicolo Ventotene Island. (For arcs of visibility see Light List.)

San Stefano Island lies $\frac{3}{4}$ mile to the eastward of Ventotene; it is about $1\frac{1}{4}$ miles in circumference, surrounded by craggy cliffs, and indented by two deep ravines. On the summit of the island, 223 feet above the sea, is a circular building, formerly a State prison. There is also a well of good water.

Shoals.—A patch of $5\frac{1}{2}$ fathoms lies with San Stefano Prison bearing 84° , distant 800 yards, and at 200 yards 36° is another patch of 4 fathoms.

In mid-channel between Ventotene and San Stefano are depths of from 7 to 11 fathoms.

The Gulf of Gaeta lies between Mount Circeo and the Islands of Ischia and Procida (off the northern extremity of the Bay of Naples), between which it is 45 miles across and about 20 miles deep. The shores are alternately extensive swampy plains and high ranges of hills, the latter disappearing southward of the town of Gaeta, which is situated on a prominent rock point about the middle of the gulf; southward of Gaeta the country is very flat. The water is deep throughout, and the shore may be safely approached within 1 mile.

Port Badino.—From Giano Point (the southeast point of Mount Circeo) a sandy coast trends about east-northeastward 6 miles to Port Badino, at the entrance to the Morticino and Botte Canal; it is marked by the two following buildings, on its right bank:

Torre di Badino, near the sea, does not show as a tower from the offing as there is a house with an inclined roof against its eastern side; on the tower is a remarkable masonry structure bearing the iron cage from which a light was formerly exhibited; a reddish building with a campanile stands a little farther inland.

The Porto Canale, which is entered between two moles, is only suitable for small vessels of light draft. The canal is crossed, a little inside the tower, by a floating bridge, which is opened when required.

At 200 yards outside the entrance there are depths of from 6 to 9 feet, deepening to 5 fathoms at $\frac{1}{4}$ mile from the shore.

Lights.—Two fixed lights are exhibited at Badino, elevated 20 feet above the sea, one, red, placed 44 yards from the extremity of the West Jetty Head, and one, green, 30 yards from the East Jetty Head; both lights are visible 6 miles, and are shown from iron brackets on stone buildings.

Shoal.—A shoal, with a depth of $\frac{3}{4}$ fathom, extends about 150 yards north-northeastward from the mole.

Terracina is a small town with a population of 11,000, picturesquely situated, partly on the declivity of a rugged eminence, and partly on the low ground, at the entrance to the canal built by Pope Pius VI for the purpose of draining the Pontine Marshes. It was anciently called Anxur, the temple and ruins of which can be seen on the heights above. On the hill on which is the old city, isolated and conspicuous, are the ruins of a temple of Venus, and immediately below them, near the large masonry arch of Porta Napoli, is a remarkable rocky monolith. Gregoriano Palace, an old large yellow building, is in the western part of the new town, near the beach.

The port is within a mole, now being lengthened, but it is only suitable for small craft. A sandbank, with 5 feet water, extends about 130 yards north-northeastward from the present head of the mole. Near the root of the mole is the mouth of the Porto Canale di Terracina, which has masonry sides, but little depth of water.

Light.—An occulting white light is exhibited, at 23 feet above high water, from an iron standard with a hut, about 55 yards from the molehead.

Anchorage can be obtained during winds between west-southwest and north-northeast, eastward of Monte Circeo and distant about $1\frac{1}{2}$ miles from Torre Vittoria, in 7 fathoms water, or east-northeastward of Terracina mole in the same depth, but these anchorages must be left on southerly winds setting in. The mountains northward of Monte Circeo covered with clouds indicate southeasterly winds, and clouds to the eastward of the mountains of Terracina south to southwesterly winds.

Tide.—A rise and fall of tide of several feet has been reported as observed here.

Wreck—Light.—The wreck of the schooner *Nelly*, with masts above water, lies sunk in Terracina Harbor, 440 yards 30° from the lighthouse on the mole.

When the weather permits a white light is exhibited from the wreck.

The coast.—From Terracina the coast trends to the southeastward $15\frac{1}{2}$ miles to Gaeta; as far as the village of Sperlonga, 8 miles distant, the shore is low and sandy and the country marshy; eastward of Sperlonga the coast is a succession of bold cliffy points and sandy beaches, backed by an elevated and, in some places, well-wooded country. Mount Magno, 1,595 feet above the sea, lies $1\frac{1}{4}$ miles from the beach northeastward of Sperlonga.

Between Terracina and Sperlonga is lake Fondi having two outlets to the sea; one at the foot of the hills $1\frac{1}{2}$ miles eastward of Terracina, the other $2\frac{3}{4}$ miles farther eastward; on the beach near the latter outlet is a square tower. Sperlonga stands on elevated ground a short distance inland.

On the rocky points between Sperlonga and Gaeta are five towers; that in the middle (San Agostino) having several houses near it.

Gaeta (ancient Caieta) is a strongly fortified town facing the sea, and occupying the eastern and northern slopes of an elevated promontory (548 feet high), separated from the wooded country westward of it by a low and narrow isthmus.

The southern side of the promontory is formed of inaccessible cliffs and on the north and west (land side) are strong defensive works.

Gaeta contains a cathedral (St. Erasmo), several churches, convents, citadel, hospital, arsenal, and naval depot; the population is about 5,625. The large castle, now a prison, in the eastern part of the town, is noticeable, and the town appears from the anchorage to be surrounded by fortifications, within which the campanile of Sant' Erasmo cathedral and the church of Santo Francesco are conspicuous.

Elena, the old suburb of Gaeta, extends along the western shore of the bay northward of Gaeta, and on the road leading to Formia; its houses are low and white. The population is about 11,169 and Giano Tower forms a bay about $4\frac{1}{2}$ miles broad and 2 miles deep; the shore of the bay should not be approached nearer than $\frac{1}{2}$ mile. On the northern side, and immediately within the eastern extremity of Gaeta, is the port, formed by a mole 300 feet long, extending in a northwestern direction from the southeastern part of the town. The depths decrease from 7 fathoms at the entrance to 7 feet alongside the quay; the port is about 200 yards square.

Torre Atratina, on the north part of Monte Atratina, about 400 yards inland and westward of Elena, is red, circular, and conspicuous; and Convento dei Cappuccini, a white building, about 400 yards farther northward, is also noticeable.

Several small piers extend off the towns; the largest is Il Pizzone, at the northern end of Elena.

Semaphore.—On the summit of Mount Orlando, 548 feet above the sea; there is a semaphore station.

Lights—Santa Caterina.—A group flashing white light, elevated 244 feet above the sea and visible 18 miles, is exhibited from a white tower, 74 feet high, with octagonal top and cylindrical base, at the southern angle of the military hospital on the southeastern extremity of the promontory of Gaeta, partly absured by Mount Orlando. (See Light List.)

Stendardo Point.—An occulting red light, elevated 62 feet above the sea and visible 5 miles, is exhibited from the white hexagonal tower of Santa Maria, near the entrance to the port of Gaeta. (See Light List.)

Buoy.—A warping buoy, for the use of fishing boats and small sailing vessels, is moored about 550 yards 57° from Altratrina Tower, before Elena Village.

Point S. Antonio—Works in progress—Buoys.—Four buoys are moored near Point S. Antonio, to mark works in progress.

Rocks.—Three small rocks exist in Gaeta Bay close inshore. One with 5 feet of water over it, situated off San Antonio Point, with Orlando tower bearing 184°, distant 900 yards; the others have 6 feet of water over them; one is situated with the end of Il Pizzone bearing 251°, distant 200 yards, and the other with Arzano Palace bearing 298°, distant 200 yards.

La Colonna Shoal—Beacon.—Lies opposite the town of Elena, 109 yards from the shore; it is marked by a beacon consisting of an iron tripod and staff with topmark, painted black and white.

Anchorage.—The bay of Gaeta affords excellent anchorage during winds from south around by west to northeast; it is most exposed to the southeast, and with northeast winds there is a considerable surf in the port; the wind, however, seldom blows home, but the swell is at times heavy. The western side of the bay is the most sheltered, and anchorage may be taken up in from 8 to 13 fathoms water, over black mud and clay, which holds well. It is advisable to frequently sight the anchors. Twelve sets of moorings, for the use of Italian naval vessels, are laid in the bay, the two outer lines being for vessels of heavy tonnage, the inner for smaller vessels of not more than 4,000 tons, during the winter gales. No. 12 buoy is a mooring buoy, to which large vessels can shackle direct; the other buoys are small and conical, and only support the buoy chain attached to the bridle, which must be hove in. A red mooring buoy lies about 200 yards from the shore, off the southern end of Elena, with the semaphore on Mount Orlando bearing 175°, distant 1,200 yards.

Anchorage is prohibited in the immediate neighborhood westward of Stendardo Point, this part being used by torpedo boats.

Torrente Pontone—Pier.—A wooden pier extends about 220 yards southeastward from the shore about 100 yards southwestward of the mouth of Torrente Pontone, which flows into the bay nearly 1 mile northeastward of Il Pizzone.

Current.—A current sets southward on the west shore of the bay during southerly winds; on the wind veering to northwest it turns to the opposite direction.

Supplies.—Provisions are abundant. Water is scarce, but a floating tank supplies water, obtained at Formia, to naval vessels. There is no coal on sale.

Hospital.—The civil hospital has 400 beds, and receives medical and surgical cases, provided they are neither venereal, chronic, nor infectious.

Communication.—There is a branch railroad from Gaeta, via Formia, to Sparanise, where it connects with the line from Rome to Naples.

There is also telegraphic communication.

Buoys.—A white iron cylindrical mooring buoy lies northward of Punta dello Stendardo, and eleven white conical mooring buoys, disposed in three lines running north and south, are placed in the bay, the outer line consisting of three, the middle of five, and the inner of three buoys. The two outer lines are for large vessels, and the inner for vessels not over 4,000 tons, in winter. The cable can be shackled direct to the cylindrical buoy, but the conical buoys only support the chain attached to the bridle. These buoys are for the use of Italian naval vessels.

Two white conical mooring and working buoys lie in the port of Magnamanica for the use of torpedo vessels.

Pier.—A pier, 655 feet long, has been constructed at the mouth of Pontone River, $1\frac{1}{2}$ miles northeastward of Elena.

Light.—From the head of this pier, at an elevation of 12 feet, is exhibited a fixed red light, visible 1 mile.

Tide.—It is high water, full and change, at about 7 hours 15 minutes, the rise about 1 foot; the tides, however, are not regular, and strong westerly winds raise the water 1 foot higher than usual.

Winds.—In fine weather the prevailing winds at night are from northwest to northeast which continue until after sunrise; it then becomes calm and about 9 o'clock the sea breeze sets in from the south-southeast, gradually veering (by south, to west-southwest and continues to blow fresh until the evening when it dies away and is succeeded by the land breeze. In unsettled weather there are often during the night heavy squalls from the north, with rain, lightning, and thunder.

Supplies—Coal—Communication.—Refreshments of all kinds, also wood and water, can be readily obtained in any quantity. The

Italian Government keeps a stock of about 20,000 tons of Welsh coal. There is frequent steam communication with the principal ports of Italy, and it is connected with the railroad to Naples.

Formia (ancient *Formiæ*), some of the ruins of which still remain, stands on the beach in the middle of the bay about 3 miles northeastward of Gaeta; the population amounted to 8,700.

La Pila Rock.—The depth on La Pila Rock over the foundation of an old beacon is 3 feet, and deep water close outside, lies with Formia Point bearing 29° , distant 750 yards.

Light.—A flashing red light is erected on the extremity of the west mole at Formia.

The light is exhibited from an iron column $19\frac{1}{2}$ feet high located 930 yards 217° from S. Teresa Church and is visible 3 miles. (See Light List.)

Buoy.—A buoy marking the southern edge of the shoal extending from La Pila Rock is moored in a position from which the steeple of Santa Teresa Church bears 7° , distant about 1,150 yards.

Giano and Scavori Towers stand on the point forming the eastern boundary of Gaeta Bay; immediately over them is an isolated hill and between them another tower.

Garigliano River (the ancient *Liris*) rises near the town of Tagliacozzo, and flows toward the southeast, receiving as tributaries the Sacco and Melfa; at a distance of 8 miles from the shore it turns to the westward, and passing through the plain of Sasso, enters the Gulf of Gaeta, after a course of 75 miles. About $1\frac{1}{4}$ miles from the entrance it is crossed by a wire suspension bridge, near which are the ruins of the ancient *Minturnæ*; on the southern bank, a short distance within the mouth of the river, is a tower.

The coast between the Garigliano and Volturno Rivers is a low sandy beach, the country behind being flat and marshy. Limatola and Mondragone Towers stand on the beach about midway, and between them is a group of hills; a depth of 5 fathoms will be found at 1 mile from the shore, which should not be approached nearer than that distance.

Volturno River (the ancient *Volturnus*) rises in the Apennines in the Province of Campo Basso, and flows to the southeastward until its junction with the Calore from the eastward, at about 22 miles from the coast; it then turns toward the west, and passing the fortified city of Capua, enters the Gulf of Gaeta, 14 miles southward of the Garigliano River, after a course of 90 miles. The river has a broad entrance, but is encumbered by sand banks, and the bar has only 3 feet water over it; there is, however, an occasional rise of tide of from 2 to 3 feet.

On the southern point of entrance to the river is a tower, and on the same bank $1\frac{1}{2}$ miles from its mouth is Castelvoturno with a

chapel surrounded by ruins. The country is very fertile and is famous for its grapes and wine.

Light.—A flashing white light is erected at the entrance to the Volturno River.

The light is exhibited 27 feet above sea and 21 feet above the ground from a skeleton iron tower on a concrete foundation and is visible 11 miles.

The coast.—Patria Tower stands on the beach $7\frac{1}{2}$ miles southward of the entrance to Volturno River, near the entrance to a lake of the same name, and farther southward is the entrance to Lake Licola, a narrow sheet of water $1\frac{1}{2}$ miles in length lying parallel with the shore; at the southern end of the lake, near the beach, are the ruins of the ancient Greek city of Cumæ. The country southward to Cape Miseno is undulating and of moderate elevation.

At $3\frac{1}{2}$ miles southward of the entrance to Lake Licola is Gaveta Tower on a rocky point at the termination of the low sandy beach and wooded shore extending southward from the Garigliano River; a short distance southward of the tower is the entrance to Lake Fusaro, the land southward of which rises to the rugged headland of Mount Procida. Fumo Point, the southwestward termination of Mount Procida has a tower on it, between which and Cape Miseno, $2\frac{1}{2}$ miles distant, the shore trends to the eastward, forming a low narrow isthmus with a sandy beach named Miniscola, between the eastern foot of Mount Procida and the rocky promontory of Cape Miseno. All this coast is skirted by rocks, shallow water extending, in some places, 600 yards offshore.

At Gaveta Tower, which is the terminus of a line of railroad from Naples, it is intended to construct a harbor, where steamers will be able to ship passengers for the islands in all weathers.

Measured distance.—Marks indicating a measured distance for speed trials are now placed on the shore northward of Procida.

A pyramid 33 feet high, checkered black and white, in line with the chimney on the summit of a hill, are the southern marks.

Two pyramids similar to above form the middle marks.

Patria Tower in line with a similar pyramid are the northern marks.

From the southern to the middle marks the distance is 6,174 feet, and from the middle to the northern marks 11,772.

The running course is 148° , with Gaveta Tower on the same bearing.

San Martino Rock lies 600 yards from the shore, 1 mile 205° from Gaveta Tower; southward of it foul ground extends some distance from the shore, and off Fumo Point shoal water extends upward of 1,400 yards in a southwesterly direction.

Cape Miseno is a high, bold rocky promontory, shelving to the southward, and may be safely approached within $\frac{1}{4}$ mile; on it are two towers, and the summit is crowned by ancient ruins. About 200 yards from the shore on the western side of the cape are the ruins of a submerged town.

Light.—From the southern and highest of the two towers (octagonal yellow above dwelling) on Cape Miseno, at an elevation of 292 feet above the sea, is exhibited a fixed and flashing white light visible 22 miles, and the fixed light 10 miles. (For arc of visibility see chart and Light List.)

Mezzogiorno Bank, $1\frac{1}{4}$ miles southward of Cape Miseno, is about 800 yards long northeast and southwest, 300 yards broad, with 14 fathoms least water, and from 23 to 49 fathoms around. Banco Benta Palumno, $2\frac{1}{2}$ miles southeastward of Cape Miseno, is small with 23 fathoms water, and about 1,200 yards southward of it is a similar bank with 27 fathoms water; there are depths of from 33 to 47 fathoms in the vicinity of these banks.

Procida Channel, between the highland of Mount Procida on the mainland and the island of Procida, is $1\frac{1}{2}$ miles wide, but the navigable portion is much contracted by the foul ground extending southwestward from Fumo Point (under Mount Procida) and Torrione Shoal, and by similar shoal patches from the northern side of Procida Island. The channel between these shoals is only 800 yards wide and carries depths of from $4\frac{1}{2}$ to $7\frac{1}{2}$ fathoms, sandy bottom.

Buoy.—A red lightbuoy marks the southern extremity of Torrione Shoal, northern side of Procida Channel. The light is flashing red, elevated 10 feet above the sea, and visible 7 miles.

NOTE.—Reported missing in 1915.

Shoal.—A small rocky shoal, with $1\frac{1}{2}$ fathoms of water on it, lies 220° about $\frac{1}{2}$ mile from Gaveta Tower.

Procida Island (ancient Prochyta) lies $1\frac{1}{2}$ miles 194° from Fumo Point; it is $1\frac{1}{2}$ miles in length and varies between $\frac{1}{2}$ and $1\frac{1}{4}$ miles in breadth, of a very irregular outline, and of evident volcanic origin. The island is of moderate elevation and covered with orchards and vineyards. The population is 13,446, chiefly sailors and fishermen engaged in the tunny and coral fisheries. Procida, the chief town, covers a considerable extent of ground on the northeastern side of the island; above it rises the castle with a semaphore, now a royal palace.

Lingua, the northeastern point, is bold; a group of rocks above water lies a short distance southeastward of it, with 5 fathoms at about 200 yards off. The eastern side of the island is divided into two bays of nearly equal size by Pizzaca Point; the northern has a depth over it of from 4 to 15 fathoms and is open to the south—

eastward. The southern bay is deeper and more exposed; close over the northern shore is Mount Solaro, the highest point of the island.

The water is deep around Socciaro (the southeastern) Point, and a good boat harbor is formed between it and the southwestern point, partly sheltered by the island of Vivara. On the western side of Procida rocks and shallow water extend $\frac{1}{4}$ mile offshore. Upon Piopetto, the northern point, there is a light tower 51 feet high.

The northern side between Piopetto and Lingua Points is shoal, extending near the latter point nearly 600 yards from the shore. A patch of hard ground with only 6 feet water over it lies 323° nearly $\frac{1}{4}$ mile from Lingua Point (in which direction the water is shallow for a distance of 400 yards beyond) and 1,200 yards 95° from the lighthouse.

Tunny fishery.—Tunny nets extend nearly 1 mile from the shore in a northwestern direction, on the western side of Procida, $\frac{1}{2}$ mile to the southward of Vove Point.

Semaphore.—At the castle previously mentioned is an electric semaphore station by which passing vessels can communicate. The buildings are painted in black and white checkers.

Piopetto Point.—An occulting white light, elevated 67 feet above the sea and visible 14 miles, is exhibited from a yellow square tower above octagonal dwelling, 43 feet high, situated near the northern extremity of Piopetto Point, the northern extremity of Procida Island. (See Light list.)

Vivara, a small island 358 feet high, about $1\frac{1}{2}$ miles in circuit, covered with brushwood, and having an old tower on its summit, lies off the southwestern end of Procida, to which it is nearly connected. A bay about 800 yards wide is formed between it and Procida Island, affording shelter for coasting vessels from all but southeasterly winds.

The Formiche di Vivara lies $\frac{1}{2}$ mile 284° from the western extremity of Vivara and 1 mile 37° from Ischia Castle Point; over it are 2 fathoms water, with from 9 to 12 fathoms around it. The bottom in the vicinity is very uneven, there being patches of 9, 8, and $4\frac{1}{2}$ fathoms, with 16 and 25 fathoms between them.

Lightbuoy.—A lightbuoy showing an occulting red light is moored on the western side of Formiche di Vivara.

Ischia.—This beautiful island, known to the ancients as Arme, Ænaria, and Pithecusa, lies $1\frac{1}{2}$ miles to the westward of Vivara; it is in the form of an irregular parallelogram, $5\frac{1}{2}$ miles long east and west, and from $3\frac{1}{4}$ to $4\frac{1}{4}$ miles broad. The surface of the island is mountainous and bears evidence of volcanic convulsions; the highest peak (Mount Epomeo), on which is the hermitage of San Nicolo, elevated 2,598 feet, is an extinct volcano, and there are several other

extinct craters on the island. No eruption has been recorded since the year 1301. An earthquake, accompanied by great loss of life occurred in 1881, and again in 1883 and 1887, by which the village of Casamicciola and others near it were entirely destroyed.

Although the country is in many places strewed with large masses of rock, it is nevertheless most fertile, producing an abundance of grapes, figs, and other fruits, and on the hilly ground are the oak, ilex, chestnut, and copses of evergreen shrubs. There are many hot mineral springs, especially near the village of Casamicciola, on the north side of Mount Epomeo, which are much resorted to.

A pottery clay is found and manufactured into pitchers and tiles. A large number of the population are chiefly occupied in fishing and agriculture; brickmaking and straw work are local industries.

The chief towns are Ischia on the northeast coast, Forio on the west, Lacco (partly destroyed by earthquake) on the north, and Panza, Fontana, and Barano on the south.

The town of Ischia extends along the coast between the root of the dike and Porto d'Ischia, $1\frac{1}{2}$ miles northwestward, and has a small cathedral; there is a population of about 7,000.

The coast is chiefly rocky and in some places bold and very precipitous, especially on the southeastern side; off the north and west side, however, shoal water and rocks extend nearly $\frac{1}{2}$ mile from the shore.

Castello d'Ischia is on a high circular rock, named Negrone, off the eastern side of the island, and connected to it by a dike 400 yards long, through which is a boat passage with an arch over it. The eastern side of the rock is steep-to, but a bank extends nearly 400 yards from the coast both northward and southward of the dike, and on the southern side are Scogli di Sant' Anna, a group of rocks above water. Coasting vessels moor northward and southward of the rock according to the wind.

Light—Ischia Castle.—A flashing white light, elevated 131 feet above the sea, and visible 11 miles, is exhibited from an iron framework on Ischia Castle. (See Light List.)

Communication.—There is daily communication to Naples and Pozzuoli.

Port Bagno, $1\frac{1}{2}$ miles to the northward of the Castle of Ischia, is a small basin with a very narrow entrance, open to the northeastward. On the outside it is protected from the northwest by a curved mole of about 300 yards in length, which incloses a depth of from 2 to 3 fathoms; 400 yards beyond the mole head is a depth of 5 fathoms, outside which the water rapidly deepens.

About $\frac{1}{2}$ mile southwest of the port is a deep crater.

Vessels entering should not keep too close to the mole, as a bank of sand, with less than 6 feet, extends a short distance from it.

Banks of seaweed at times accumulate off Port Bagno, which are sufficiently dense to impede the progress of a vessel.

Lights.—On the extremity of the mole at Port Bagno is a red circular tower, 36 feet high, with gray rectangular base, from which is exhibited, at an elevation of 44 feet above the sea, a flashing white light visible 12 miles. Light may easily be confused with the lights of the town. (See Light List.)

The entrance to the port is marked by a fixed green light on the western side, and a fixed red light on the east; both are elevated 14 feet, and are visible 1 mile.

Casamicciola.—One mile westward of the port is Serofa Point, the coast between being rocky; $1\frac{1}{4}$ miles farther on is Vico Point, between which and Serofa the shore is chiefly a sandy beach, in the middle of which and on the slopes of Mount Epomeo ($\frac{1}{2}$ mile in-shore) stands the large village of Casamicciola, with a population of 3,500. At the western extremity of the beach is the town of Lacco. Between Port Bagno and Vico Point the shore should not be approached within $\frac{1}{2}$ mile.

Tunny fishery.—Tunny nets extend 1,422 yards in a northerly direction from the coast off Lacco.

Cornacchia Point, the northern extremity of the island, is the eastern point of a bold headland, faced with cliffs, $\frac{1}{2}$ mile in extent, which projects to the northwest; on the point is Zale Tower, and on the summit of the headland is a conspicuous building.

Forio.—**Imperatore Point**, the southwest point of the island is about 3 miles 194° from Caruso Point, the southwestern extremity of the above headland. On a low point nearly midway is the town of Forio. In the bay northward of the town shallow water extends $\frac{1}{4}$ mile offshore, but off the town and in the bay to the southward (between Forio and Imperatore Point) shallow rocky patches extend $\frac{1}{2}$ mile out. There is a small pier on the northern side of the town and there are mineral springs in the neighborhood; the vine is extensively cultivated in the neighborhood.

Light.—A fixed and group flashing white light, elevated 538 feet above the sea, and visible flash 26 and fixed light 22 miles, is exhibited from a lantern with red top surmounting a white dwelling, situated near the extremity of Imperatore Point. (For arc of visibility, see Light List.)

San Angelo Point.—From Imperatore Point a bold coast, close off which are several high rocks, trends southeastward $2\frac{1}{4}$ miles to the prominent point of San Angelo. It is connected to the shore by a narrow sandy isthmus and on the summit is a ruined tower. In the

bay on the western side of San Angelo are two rocky patches of 9 and 12 feet water 300 yards from the shore and in the bay on the eastern side off a sandy beach $1\frac{1}{2}$ miles in extent shallow water extends $\frac{1}{4}$ mile, but the point is steep-to.

From Grosso Point, the eastern point of the above bay, an indented shore faced by high cliffs and steep-to, trends 1.3 miles eastward to San Pancrazzio Point, on which is a chapel, and thence a similar coast turns to the northeastward and north-northeastward $1\frac{1}{2}$ miles to the Castle of Ischia.

Ischia Channel, between Vivara Island and Ischia, is $1\frac{1}{2}$ miles wide, and, with the exception of the Formiche di Vivarai, is deep and clear of danger. From the northward steer through the channel with Castello d'Ischia bearing 180° until Punta Socciaro is open southward of Punta Mezzodi, the southern point of Vivara, when turn southeastward; from the southward pass $\frac{1}{4}$ mile northeastward of Castella d'Ischia, and steer about 342° . Porto d'Ischia Mole Lighthouse bearing 270° leads northward of Formiche di Vivara. Banks of seaweed at times accumulate in Ischia Channel sufficient to impede the progress of a vessel.

Winds.—The western side of Monte Epomeo, covered with clouds, indicates southerly and southeasterly winds; Monte Circeo showing very clearly indicates westerly winds.

Currents.—The currents along the coasts of Isola d'Ischia are weak, and usually set with the wind. In Canale d'Ischia the currents attain considerable rates, which, and the directions, are uncertain. In fine settled weather the direction changes every six hours, the streams becoming tidal.

The Gulf of Naples lies between Cape Miseno and the islands of Procida and Ischia, on the north, and Campanella Point and Capri Island, on the south; the main entrance, named the Bocca Grande, is between Ischia and Capri and is 14 miles wide, the gulf extending thence 17 miles in an east-northeast direction. The water is deep throughout and the shore may be approached anywhere within a mile.

At the head of the gulf is Mount Vesuvius (4,206 feet in height), its conical form being the more conspicuous from the surrounding country in the immediate vicinity being low. The northern shore of the gulf is high and the country is covered with craters of extinct volcanoes. The promontory forming the southern shore has a ridge of lofty mountains extending its whole length, the highest peak of which, Mount San Angelo (4,734 feet high) falls abruptly on its northern side to the low land between it and Mount Vesuvius.

Porto Miseno is $\frac{3}{4}$ mile northward of Cape Miseno; the entrance, between the spits extending from Punti Terone on the south and

Pennata on the north, is about 100 yards wide, with depths of from 4 to 6 fathoms, and during a strong breeze from the southeastward the sea breaks right across it. The part of the port outside Punta Scarparella, which is situated 600 yards northwestward of Punta Terone, is bordered by banks with shoal water, leaving a space in the middle nearly 400 yards wide with depths of from 4 to 6 fathoms. The inner part of the port is a circular basin, with depths decreasing from 2 fathoms in the entrance. The port formerly included Mare Morto, a lake to the westward, and was then about 1 mile in extent; they are now separated by a causeway, which is crossed by an iron swing bridge, supported by three large stone pillars. A wooden pier with a masonry head, near which is a depth of about 10 feet water, extends 130 yards from the southern shore of the inner part of the port; it is furnished with rails and cranes.

Bacoli Village lies on the north shore of the port, and between it and Mare Morto is a Roman cistern in good preservation.

Beacons.—The entrance to the port is marked by two beacons; one, painted black and white in horizontal stripes, is on the end of the spit extending about 200 yards northeastward from Punta Terone; the other, painted red, on the end of the spit extending about 100 yards southeastward from Punta Pennata; the latter has been washed away by the sea, but is being rebuilt (1916).

Buoys.—The end of a spit extending southwestward nearly 200 yards from Punta Pennata, is marked by a red buoy; a red buoy, marked "Segnale di Secca," lies near the northern end of the shoal ground about 100 yards northwestward of Punta Scarparella. There is a white mooring buoy, marked "Boa da Ormeggio" in black letters, in the middle of the port, and a similar buoy off the magazines in the inner part.

Directions.—Enter the port with the yellow customhouse at the head of the port, southward of the canal leading into Mare Morto, bearing 290° , when it will be in line with the mooring buoy in the middle of the port, which leads into the port and southward of the red buoy at the end of the spit extending southwestward from Punta Pennata.

The southern part of the port is reserved for military purposes.

Communication.—Bacoli has telegraphic communication.

Pozzuoli Bay, lying between Capes Miseno and Caraglia, is $4\frac{1}{2}$ miles wide at the entrance and extends in a northwest direction for $3\frac{1}{2}$ miles. On the northern part of the western shore is a castle, and the remains of the ancient city of Baia; on the opposite shore nearly eastward of it is the town of Pozzuoli, and near the eastern point of entrance the island of Nisida. The whole intermediate country, and also extending beneath the sea for some distance from the shore, is strewn with ancient ruins.

Fumosa Reef.—The head of Pozzuoli Bay is shallow for $\frac{1}{2}$ mile out; Fumosa Reef, a rocky patch with only 3 feet water on it, lies 213° nearly $\frac{1}{2}$ mile from Canuso Point and nearly the same distance from the beach at the head of the bay. To pass southward of the reef keep a white house (300 yards inshore of Baia Mole) in range with the southern side of the ruins of the Temple of Venus.

Beacon.—A stone beacon, colored vertically with alternate stripes of white and red, is erected upon the Fumosa Reef.

A rock, with $2\frac{3}{4}$ fathoms water, lies 150 yards southwestward of the beacon.

Baia.—The castle of Baia, Baja of the Italians, is 2 miles northward of Cape Miseno; it is situated on a steep point and covers a considerable space, and on a low point under it is Tenaglia Fort. On the northern side of the fort is a small bay around the head of which are the ruins of the ancient city; a mole projects from the shore near the main part of the ruins.

The head of Pozzuoli Bay is divided into small bays by Epitaph Point; in the middle of the northern beach is the outlet of Lake Lucrino.

Lago di Lucrino, the outlet from which is through the beach about $\frac{1}{2}$ mile northeastward of Point Epitaph, was formerly connected by a canal with Lago Averno, about 600 yards to the northward. These lakes formed Portus Julius of Agrippa.

Lago Averno is about $\frac{1}{2}$ mile in extent, and has depths of more than 40 fathoms, the water level being about 4 feet above that of the sea. It is surrounded, except in the vicinity of the canal, by wooded hills, and it contains various kinds of fish. The canal and a large part of Lago di Lucrino were filled in by an eruption of Monte Nuovo in 1538.

Monte Nuovo, about 800 yards northeastward of Lago di Lucrino, is an extinct volcano, 460 feet high, the crater of which is about 400 yards in diameter and about 440 feet deep; it is covered with small green wood.

Monte Barbaro, 1 mile northeastward of it, is a crater about $\frac{3}{4}$ mile in extent and 1,079 feet high; its slopes are covered with vines, and on the northwest peak is the church of Sant' Angelo della Corvara. About $\frac{1}{2}$ mile southeastward of Monte Barbaro is Monte Cigliano, a small crater.

Bambinella, about 1,400 yards eastward of Lago di Lucrino, is marked by a fallen building on the beach, with some of the ruins in the sea. There is a pier westward of Bambinella, 130 yards long, with a depth of 7 feet at its head, and furnished with rails.

Light.—At Tenaglia Fort is a white iron octagonal tower 31 feet in height, from which, at an elevation of 51 feet above the sea, an occulting red light is exhibited, visible 7 miles. (See Light List.)

Buoys.—A red cylindrical warping buoy is moored in 12 fathoms water about 300 yards southwestward of the beacon, and a similar mooring buoy is moored in 7 fathoms water 300 yards westward of the beacon. A white buoy is moored in 12 fathoms water, about 700 yards southeastward of the beacon, with four red buoys about 250 yards around it, for swinging vessels to adjust compasses.

Pozzuoli.—This town occupies a point $1\frac{1}{2}$ miles eastward of Baia, and contains a population of about 22,840. The extensive ruins in the neighborhood testify to its opulence previous to 1538, when it was overwhelmed by the eruption of Mount Nuovo. It is still an Episcopal town, contains a cathedral, and in the neighborhood are mineral springs, small quantities of sulphur being also procured from near the semiextinct volcano of Solfatora, 1 mile to the northeastward of the town. Arrangements have been made to supply the town with water.

At Pozzuoli the firm of Sir W. Armstrong, Mitchell & Co. have extensive works and all appliances necessary for manufacturing the heaviest class of artillery. The works stand on about 50 acres of land with a sea front over $\frac{1}{2}$ mile in length. Molo Armstrong is furnished with rails; there is a crane capable of lifting 160 tons on its head, and smaller ones along it.

The materials used are almost entirely of Italian production, and all the operatives, without exception, are Italians.

A village has been built for the purpose of housing the workmen.

A pier 225 yards long, with a depth of water at its head of 29 $\frac{1}{2}$ feet, has been built about 800 yards to the northward of Pozzuoli, and having thereon, at its extremity, a pair of hydraulic shears capable of lifting 160 tons. Four smaller hydraulic cranes are placed at different points of the pier.

Buoys.—A buoy is moored in 9 fathoms 400 yards 239°, a second in 6 fathoms 200 yards 262°, a third in 7 fathoms 300 yards 172°, and a fourth in 8 fathoms 300 yards 211° from the above pier. There are also two buoys on each side of the pier.

Communication.—There is a railroad from Naples (Monte Santo) to Gaveta Tower, with intermediate stations at Fuorigrotta, Bagnoli, Pozzuoli, and Baia. Steamers run daily from Pozzuoli to Procida and Casamicciola (Ischia).

A mole, constructed upon the ancient arched piers called the bridge of Caligula, runs out 400 yards in the direction of Baia, and has a depth of over 4 fathoms on south side. These piers, of which several remain, are of brick faced with stone; their date is unknown, for although their construction has been popularly ascribed to Caligula, the bridge which he made for crossing the head of the bay was one of boats. This is now restored and rebuilt and forms an

inclosed and safe harbor for the shipping, which it is expected will largely resort to this port in consequence of the erection of Armstrong's works.

Light.—At the extremity of the Caligoliano Mole of Pozzuoli, from a white circular turret over square building, 27 feet in height, is exhibited an occulting green light, elevated 37 feet above the sea, visible 6 miles. (See Light List.)

Bagnoli Village, with numerous bathing establishments, is situated on the beach about 2 miles from Pozzuoli; and at Miranda, southeastward of it, are two glass works and large metal works.

Piers.—In front of a large red building between the two glass works, is an iron pier 330 yards long, with 16 feet water near its head, and furnished with rails and electric hoists for rapidly discharging vessels with coal.

A little farther southward is a wooden pier, 130 yards long, with 13 feet water near its head; a third pier, about 32 yards long, with 7 feet water at its head, extends from the beach near the health office.

Buoys.—There are mooring buoys at the sides and near the head of the iron pier.

Port Paone is a small circular basin, having steep rocky sides with a mouth about 80 yards wide and open southwestward, which is divided into two parts by a rock; the passage southeastward of the rock is 50 yards wide, with depths of $5\frac{1}{2}$ fathoms. The depths in the port are from $2\frac{1}{2}$ to $1\frac{1}{2}$ fathoms, rocky bottom, and the port is but little visited; it becomes untenable with southwesterly winds.

Coast.—From Pozzuoli a rocky coast with steep slopes trends above 2 miles to the sandy beach of Bagnoli, fronting a broad and cultivated valley; on the shore are a cluster of houses and warm mineral springs. Bagnoli is full of bathing establishments, in which the thermal springs of this neighborhood are utilized.

About $1\frac{1}{4}$ miles northeastward of Pozzuoli is the largest and most perfect crater in the district, called Astroni; the rim is about 3 miles in circuit, the descent to the floor is $\frac{1}{4}$ mile, around which is a carriage drive. At the bottom are three small lakes, and the interior is covered with forest trees. A little to the southeastward is the lake of Agnamo, of an irregular outline of 2 miles, and not far from its bank, in the same direction, is the celebrated Grotto del Cane. Between the craters of Astroni and Barbaro is the smaller one of Monte Cigliano.

Nisida (ancient Neses) is a steep islet about $\frac{1}{2}$ mile from the shore, to which it is connected by a shallow flat of from $1\frac{1}{4}$ to $2\frac{1}{4}$ fathoms water; it is about $1\frac{1}{4}$ miles in circuit, and from its formation is evidently an ancient crater, the southwest rim broken down and forming an entrance to a small basin called Port Paone. On the north-western summit is an ancient palace now converted into a prison.

Close off the shore, on the northwestern and southeastern sides of the island, are two conical rocks called "the Obelisks"; and excepting off the point eastward of the entrance to Port Paone there is deep water all round seaward. Halfway between Nisida and the shore is a flat island on which is the old lazaretto; it is connected with Nisida by a mole, at the inner end of which is the new lazaretto; between the old lazaretto and the mainland there is no passage except for boats.

The port on the northeastern side of the island is formed by an irregularly curved mole extending about 600 feet to the northward; a quay extends round the shore to the inner end of the lazaretto mole, a distance of 430 yards. The port has accommodation for a few small vessels drawing 8 or 9 feet. The depths in the port are variable, but the general depth is from $1\frac{1}{2}$ to $2\frac{1}{2}$ fathoms, a space in the middle having $3\frac{1}{2}$ fathoms water.

Light.—On the extremity of the mole on the northern side of Nisida Island is a white circular tower, 58 feet in height, from which at an elevation of 76 feet above the sea is exhibited an occulting white light, visible 13 miles. (See Light List.)

Anchorage.—Pozzuoli Bay is well sheltered except from the eastward (between east-southeast and south-southwest), but the sea is not very heavy from this direction although occasionally there is a considerable surf on the shore. There is good anchorage for vessels of moderate size off Baia about 300 to 500 yards northward of Tenaglia Fort, in 6 or 7 fathoms, mud. Larger vessels anchor farther out in 16 or 18 fathoms, 700 yards 14° from the lighthouse in Tenaglia Fort; and with a clump of trees on the hill slope, in range with a white house on the shore bearing 245° ; inside this anchorage the water shoals quickly to 5 fathoms, and the bottom becomes hard sand and rock.

As a general rule, when standing toward the head of the bay, do not go beyond the line of Pozzuoli Mole, Caligula, or if farther in, not northward of the mark given for clearing the Fumosa Reef. The same mark also clears the Caruso Rock, 600 yards 180° from the point of the same name.

Measured distance.—A distance of 6,043 feet, for ascertaining the speed of vessels, has been measured to the southward of Pozzuoli. The running course is a white pillar on the northern bastion of Castello di Baia in range with the lightning conductor of Fortino Tenaglia Lighthouse, bearing 270° . The western limit is marked by a masonry pyramid, painted black and white in chequers, on the shore westward of the root of Molo Armstrong, in range with the lighthouse on Molo Caligoliano, 0° . The eastern limit is marked by

a beacon, painted black and white in chequers, situated southward of San Gennaro church, in range with a beacon, painted black and white in chequers, on a little house, situated on the coast about $\frac{3}{4}$ mile eastward of Pozzuoli, 0° . The depths on the course are from 18 to 21 fathoms.

Supplies, which can not be got in the neighborhood of the anchorage can be readily obtained from Naples; water is procured near the shore between Baia Castle and the mole, but it is neither very abundant nor particularly good.

Cape Caraglia, the eastern boundary of Pozzuoli Bay, is a broken rocky point with cliffs of about 430 feet in height; on the western fall of Posillipo Ridge and $\frac{3}{4}$ mile northward of the cape is the village of Santo Strato, and at the foot of the ridge close to the point is the small church of Sta. Maria del Faro. Close off the cape is Gaiola Rock, on which, and along the shore both above and under water, are enormous ruins of every description.

Cavallara Shoal.—There are 5 fathoms close off the points in the bight formed between Nisida and Gaiola Rock; the Cavallara Shoal, on the outer edge of which is a depth of $3\frac{1}{4}$ fathoms, extends 600 yards to the southward of the rock.

Lightbuoy.—A lightbuoy is moored on the southwestern extremity of Cavallara Shoal; it exhibits an occulting red light and is visible 6 miles. The lightbuoy is painted red and is in shape a truncated cone, surmounted by a platform and lantern 10 feet above the sea.

Naples Bay (ancient Cratur Sinus) is included between Cape Caraglin on the west and Torre del Greco at the foot of Mount Vesuvius on the east.

There is a considerable depth of water over the bay, which shoals from 50 to 60 fathoms at the entrance to 5 fathoms at about 400 yards from the shore, beyond which there are no hidden dangers; the bottom is chiefly mud with patches of sand, rock, and cinders over toward the eastern shore.

About 1 mile 65° from Gaiola Rock is Cape Posillipo, and $1\frac{1}{2}$ miles 25° from the latter is Sannazzaro Point, on which is the church of Sta. Maria del Parto. The shore is backed by the ridge which gives the name to the cape; on its eastern fall is the entrance to the famous grotto of Posillipo which perforates the hill in a western direction for 2,244 feet, and near which is the tomb of Virgil.

Sunken ruins extend a short distance from the shore, a depth of 5 fathoms being found 400 yards off.

A slightly curved mole about 300 yards long extends off Sannazzaro Point to the northeastward.

The shore from the port curves eastward $1\frac{1}{2}$ miles to Ovo Fort and is bordered by a sea wall; it is known as Riviera di Chiaia, and Rada di Mergellina, off it, affords good summer anchorage, but open to the southward. Large vessels anchor about 500 yards offshore in about 14 fathoms water, sand. There are two landing places along the sea wall, protected by small moles; they cannot be approached during bad weather from seaward.

Naples.—Napoli of the Italians, and Neapolis of the ancients, was first colonized from the Greek city of Cumæ. The population of Naples is about 724,000. It rises from the shore in the form of an amphitheater, divided into two unequal crescents by the hill of Martino, that to the eastward containing the greater portion of the city. On the north it is bounded by the Capodimonte Hills, on which are a royal palace and observatory. On the west is the Hill of Chiaja approaching nearer the shore, beyond which at the back are the far extended suburbs; some magnificent streets are in process of construction on ground recovered from the sea; this is the quarter in which all the best hotels are situated, and the promenade is along the new sea wall. On the east is the fertile plain of Campania; and crowning a height in the center of the city is the conspicuous castle of St. Elmo. The shore is fronted by terraced gardens and long quays.

The city is intersected by several long streets, one of which, the Via Roma (formerly Toledo), runs about $1\frac{1}{2}$ miles north and south between the museum and the plaza facing the royal palace, and divides the old town from the more recently built district. It includes many public edifices, among which the cathedral, palace, exchange, record office, museum, naval and military colleges, the new gallery "Umberto I," and the theater of San Carlo are the principal.

At the head of the military port is Castello Nuovo, and on the island southwestward of the above, which is connected to the shore by an arched causeway, is Ovo Fort, on the height over which is St. Elmo Castle. There is a royal dockyard, an arsenal, and a foundry for ordnance, besides shipbuilding yards.

Trade.—At Naples there are iron and glass works, tanneries, manufactories of soap, chocolate, gloves, hats, earthenware, and fancy goods. The creation of a tax-free zone for the industrial development of Naples has resulted in the institution of a large number of other industries. The exports consist of wine, hemp, chemicals, medicine, perfumery, silk, cotton and woolen manufactures, timber, paper, books, live animals and animal produce, grain, drugs, leather goods, metals, stone, earthenware, glass, etc. The imports are dry goods of every description, coal, cotton, dyes, dried fish, machinery, iron, cereals, drugs, wine, chemicals, timber, stone, earthenware, glass, etc.

Consul.—The United States is represented by a consul and vice consul.

Climate.—The climate, compared with Rome, is bracing, and from September to December resembles an English summer; in February and March the winds from the eastward are cold and drying; July and August are the hottest months, and the early part of September the most wet. The thermometer seldom rises to above 84° in summer, or falls below 40° in winter, and snow rarely remains on the ground.

Barometer and thermometer.—According to observations made during a period of 10 years, the mean annual height of the barometer at Naples is 29.99; the mean monthly height in January—the highest—is 30.07, and the lowest—April—29.90. The mean annual temperature is 60.9° ; the mean monthly temperature in January—the lowest— 47.7° , in July, and August—the highest— 76.2° .

Rainfall.—The mean annual rainfall at Naples is 32.72 inches. Little rain falls in the four months, May to August, only 5 inches. The heaviest fall, 4.66 inches, is in November and the least is in July, 0.65 inch.

The city is supplied with plenty of excellent water from the Serino; a new system of drainage is in progress.

Port of Naples (Porto di Napoli).—Molo San Vincenzo extends 1,650 yards eastward from about 200 yards northward of the entrance to Porto del Molosiglio; a metal trellis tower, painted red and white in stripes, stands near the head of the mole; 400 yards from the head of the mole is an old lighthouse, and on the inner side 400 yards from its root is a naval dock. Diga Curvilinea commences 400 yards eastward of the head of Molo San Vincenzo, and extends 500 yards northeastward, whence Diga Rettilinea trends east-southeastward, parallel to the shore, about 1,100 yards, in depths of 10 fathoms, but the southeastern part of this mole is being constructed.

The port, within the moles just mentioned, is divided into Avamporto, Porto Militaire, Darsena Militaire, Porto Mercantile, Darsena dei Bacini, and Darsena Vittorio Emanuele II.

The port of Naples is formed by massive moles.

Depths.—The depths in the entrance to the port is 18 fathoms, in Avamporto from 6 to 15 fathoms, in Porto Militaire from 3 to 10 fathoms, in Darsena Militaire from 2 to $3\frac{1}{2}$ fathoms, in Porto Mercantile from 3 to 5 fathoms, in Darsena dei Bacini 30 feet, and Darsena Vittorio Emanuele 28 feet.

Inner moles.—Molo Angioino extends eastward about 400 yards from 400 yards northward of the root of Molo San Vincenzo, and from its outer part Molo San Gennaro extends about 350 yards northeastward.

Molo Orientale extends 530 yards southward from the shore eastward of Villa del Popolo, and from its southern end Molo Martello extends 300 yards westward. A mole extends about 500 yards southward from the shore about 250 yards eastward of Molo Orientale, and from its outer end Molo Curvilinea trends southwestward 250 yards and then southeastward 150 yards.

Avamporto, northward of the eastern part of Molo San Vincenzo, is used for mooring large vessels. Vessels mooring at Molo San Vincenzo should have 55 fathoms of cable out on their anchors, their sterns being hauled to the mole by hemp hawsers. The outer portion of Molo San Vincenzo is used for vessels awaiting berths in the inner ports; vessels with inflammables are moored off the old lighthouse. Four berths off Molo San Vincenzo are reserved for foreign naval vessels. They are 60 yards apart, the outside one being 300 yards westward of the old lighthouse. The positions are marked on the mole wall by a black line with the letters A, B, C, D, respectively, in black on a white ground, over it. Each berth is also marked by two beacons surmounted by triangles, which in line give the position for berthing a vessel at right angles to the mole; A is the inside berth. Vessels moor with anchors ahead and their sterns hauled toward the mole, but not nearer than 60 yards to it. There are depths of from 7 to 11 fathoms 50 yards from the mole. The naval authorities will, on request, supply large hemp stern hawsers, and these should always be used in addition to the vessel's own hawsers. In winter there should be two anchors down, one about 2 points on each bow when moored, with about 100 fathoms of cable on each, as the squalls are violent from the northward, and there should be four hawsers astern as southeasterly winds send in a heavy sea. Letter A berth should not be used by a vessel over 460 feet in length, as a longer vessel with over 60 fathoms of cable out would foul vessels lying off Molo San Gennaro. The large glass dome of Galleria Umberto, which is electrically lit at night, bearing 282° , is a good mark for anchoring in vessels of moderate length when mooring at the berths on the north side of Molo San Vincenzo, but as there are two other domes in the vicinity caution is necessary.

A naval vessel should acquaint the consul of an intended visit to the port in order that a berth may be reserved.

Westward of letter A berth is a guardship flying the admiral's flag, and six berths for vessels of the Italian Navy. No vessel is allowed inside the guardship.

Vessels moor off Molo San Gennaro, with their heads to the southeastward and their sterns hauled toward the mole by hawsers; there should be about 60 fathoms of cable out on the anchors.

Porto Militaire lies between the inner part of Molo San Vincenzo and Molo Angioino, Calata Beverello being on its western side; it is used by small Italian naval vessels.

Darsena Militaire, on the southwestern side of Porto Militaire, is entered by a channel, with a swing bridge over it, between projections from Molo San Vincenzo and Calata Beverello, in which there is a depth of $3\frac{1}{2}$ fathoms. It is used by small naval vessels fitting out or under repair.

Porto Mercantile consists of Porto Vecchio on the west, Porto Nuovo in the middle, and Porto Orientale on the east. There are several warping buoys in the port.

Porto Vecchio lies between Molo San Gennaro and Calata Piliero, Molo Angioino being on its southwestern side, and Molo Immacolatella projecting about 100 yards southeastward from the northeastern end of Calata Piliero. There is a depth of 26 feet alongside the wharf on the northern side of Molo San Gennaro, and on the mole, which is connected to the railroad, are bonded warehouses. Near Molo Immacolatella is a channel crossed by a swing bridge, giving access to Porto Piccolo, a small basin, with the customhouse for general cargo on its southwestern side, which is brought in by lighters. The health office is on Molo Immacolatella.

Porto Nuovo lies between Molo Immacolatella and Molo Trapezoidale, which extends about 250 yards southward from the shore 500 yards northeastward, and on which is the port office. Calata delle Porta di Massa, on the northwestern side of the port, is generally used by sailing vessels. The calata on the western side of Molo Trapezoidale are used by trans-Atlantic emigrant vessels.

Harbor works.—The whole of the breakwater under construction across the entrance to the port is above water, and a large trapezoidal wharf has been constructed in the northern part of the commercial port, for landing passengers; the port office is on this wharf.

The opening between the above-mentioned breakwater and the San Vincenzo Mole is about 373 yards. The eastern mole is being widened to 149 feet, the Immacolatella Nuova Mole is being adapted for the mooring of at least five big liners at the same time, and dry docks are being constructed. The port is to be extended toward the Granili by the building of a new breakwater, in course of construction; from the shore, two jetties are to be built 328 yards long and 131 yards wide, at a distance of 224 yards one from the other. The coaling quay is to be augmented by the construction of a jetty on the Vittorio Emanuele Rocks, 437 yards long and 142 yards wide, with a breakwater at its head westward, of about 87 yards beyond its original length. Railroad lines are to be laid on these new sections of the harbor. The disinfecting station is being considerably extended, a

new post office has been built near the main landing stage, as well as a health office. Two revolving bridges at the new port are being constructed, and three electric cranes have been provided on the quay for handling ordinary cargoes.

Lights—San Vincenzo Mole.—From an iron column at the extremity of the mole, an occulting red light every four seconds, thus: Light three seconds, occultation one second, is exhibited at an elevation of 31 feet above the sea, visible 7 miles in clear weather.

Lights—San Gennaro Mole.—A flashing white light, elevated 160 feet above the sea, and visible 19 miles, is exhibited from a circular stone tower, 141 feet high, with octagonal base, situated at the junction of Angioino and San Gennaro Moles.

The iron staff over hut, from which the light at the southeastern angle of San Gennaro Mole is exhibited, is 18 feet in height.

At 3 yards from southeastern angle of San Gennaro Mole is exhibited from an iron staff over a hut, at an elevation of 28 feet above the sea, an occulting red light visible 5 miles. (See Light List.)

Two fixed lights have been established at the southern entrance to the new basin, known as Vittorio Emanuele II Basin.

NOTE.—(1916) Will be changed in the near future from fixed to flashing, visible 3 miles. There will be no change in the color of the lights.

A red light elevated 23 feet above the sea, visible 4 miles, on the head of the West Mole 390 yards 54° from the light on the head of the Curvilinear Mole.

A green light elevated 23 feet above the sea and visible 3 miles on the head of the east mole.

Curvilinear Breakwater.—An occulting green light, elevated 33 feet above the sea and visible 7 miles, is exhibited from the southwestern end of the new Curvilinear Breakwater. Unwatched.

Martello Mole.—An occulting green light, elevated 26 feet above the sea and visible 5 miles, is exhibited from a turret 18 feet in height on the head of Martello Mole.

Curvilinear Mole.—An occulting green light, elevated 33 feet above the sea and visible 9 miles, is exhibited from a white circular turret 26 feet high on the head of the Curvilinear Mole. This light is obscured to the southward and westward by the wall of San Vincenzo Mole.

A small fixed red electric light is shown from the Rotonda Quay landing.

Six fixed red electric lights are shown in pairs at the three steps on the west side of Trapezoidal Wharf. (See Light List and chart.)

Naples—Landing mole—Lights.—A concrete landing mole has been constructed in the Commercial Port, eastward of the Trapezoidal Wharf. The southern end of this mole lies about 448 yards 0° from

the light on the end of Martello Mole, and from this point it extends in a 0° direction to the shore, with a width of 32 feet. A fixed red light has been established on each corner of the seaward end of the new mole. These lights are exhibited 15 feet above the water from masonry columns and are visible only in the interior of the port.

Buoys.—There are seven cylindrical iron mooring buoys in the Commercial Port, a similar one in the basin of the docks, and one, painted white, for yachts in the anchorage southward of San Vincenzo Mole.

Wreck—Buoy.—The wreck of a tug lies sunk about 109 yards southeastward of the end of the Curvilinear Mole. It is marked by a buoy with a red flag.

Anchorage.—A good berth for a large vessel during fine weather, or if only making a short stay at Naples, is about $\frac{1}{4}$ mile southward from the San Vincenzo Mole Lighthouse, in 27 fathoms, with the extremity of Ovo Fort bearing 270° ; the bottom in this position is mud. A more sheltered position will be had about half-way between the San Vincenzo Mole and Ovo Fort in 12 or 14 fathoms, sand. Moor with open hawse to the southwestward.

With any wind from the southward this is a dangerous place for boat work.

Vessels, however, usually proceed inside the moles, and should invariably do so with winds from the southward. Naval vessels are generally berthed in the military port outside the guardship flying the admiral's flag, no vessel being allowed inside her; having anchors ahead and stern hauled into the guns or bollards on the San Vincenzo Mole, the places for securing being indicated by four perpendicular white stripes, painted on the mole, and lettered A to D in black letters. These commence about 400 yards westward of the old lighthouse, are 50 yards apart, and provide billets for four vessels. It is advisable to acquaint the consul by telegraph beforehand, that a billet may be reserved for naval vessels.

In winter there should be two anchors down, north-northeast and north-northwest, with about 100 fathoms of chain out on each, as the squalls are heavy from that quarter. It is also advisable to have four hawsers out astern, as south-southeast winds bring in a heavy swell. There should be a space of 60 yards between the stern and the mole, which has 7 to 14 fathoms to within 50 feet of it. The large and conspicuous glass dome of the Arcade, electrically lighted at night, brought on a bearing, is a useful mark for dropping the anchors by, but as there are two other domes which might be mistaken for it, the conspicuous red lighthouse on San Gennaro Mole is probably a better mark.

Owing to the large number of vessels usually berthed here, considerable care is necessary to moor a vessel in the military port.

Sea level.—There is no regular tide, but a rise and fall of water is observable with winds from the southwest. With gales from this quarter there is also a considerable outset of current, so that vessels ride easier at their anchors than from the force of the wind might be expected. The greatest swell is sent into the bay with winds from west-southwest to south-southwest.

Pilots are found off the end of San Vincenzo Mole vessels requiring one make the usual signal; there are four boats distinguished by numbers 1 to 4; they carry a square flag with a white P in the center.

Regulations for boats.—Naval vessels at the San Vincenzo Mole have permission to carry on communication with the shore by means of the quay in the northwestern part of the arsenal, except from 1 a. m. to 6 a. m., when the gates are closed. Shore boats from the Commercial Port are not allowed to enter the Military Port during those hours, except by permission from the guard ship, and then only to her, the further forwarding to proper vessels being effected from the guard ship.

Regulations.—To facilitate the arrival and departure of the State postal steamers and those of the Naples-Tunis line in the east zone of the commercial port of Naples, between the Trapezoidal Mole and the head of the Martello Mole, it is ordered that from 30 minutes before to 30 minutes after the hour fixed in the official time table for the arrival and departure of the lines referred to, steamers and sailing vessels arriving and departing shall so regulate their maneuvers as not to cause any obstruction to the postal craft referred to. Offenders are liable to be punished, and will be responsible for any consequent damages.

Vittorio Emanuele II Basin.—On account of the banking works of the eastern part of the East Mole of the dry docks, vessels navigating in the basin situated immediately to the eastward of the said docks should keep in the zone (109 yards) toward the westward of the extremity of the groin of the jetty called Vittorio Emanuele II, which originates to eastward of the mouth of the Sebeto. This passage will be marked to the west by a pile erected on the head of the groin of the banking referred to.

Landing.—The best landing place is at the east gate of Castello Nuovo, that at the health office being usually crowded with boats and shipping and bad to approach.

Coal, etc.—From 79,000 to 80,000 tons of coal are kept in stock. Coaling is performed by means of lighters at the rate of 2,000 to 3,000 tons a day; 20 to 30 lighters are kept loaded, and 235 others, of 50 to 500 tons, are available; 120 tons can be loaded per hour. Tugs are available. Oil fuel will shortly be obtainable.

Docks.—There is a Government dry dock on the inner side of Molo San Vincenzo, and two floating docks; there are two private docks at the northern end of Darsena dei Bacini. (For particulars, see Appendix I.)

Supplies.—Provisions and other requisites can be readily obtained and water from spouts along the mole conveyed to the vessels through canvas hose by the dockyard department; it is supplied gratuitously to naval vessels on application; there is also a Government tank.

Sailor's Rest.—This benevolent institution (established 1883) provides for the seamen of all nations good sleeping accommodation and meals. Seamen of all nationalities can use the reading room free.

Repairs.—All kinds of repairs can be executed by the firm of C. & T. T. Pattison. Ten-inch shafts can be turned, cylinders of 72 inches diameter cast and bored, and any boiler work. There are 108 machines and lathes, large smithy and steam hammers, and engines of 4,000 horsepower have been made.

Another firm in the Società Industriale Napoletana, Miani & Silvestri (ex Hawthorn Guppy), who principally undertake the construction of machinery.

Also at Pozzuoli, Sir W. Armstrong & Co. have constructed a large establishment for the manufacture of ordnance for the Italian Government.

Telegraph cable.—The telegraph cable from Palermo is landed near the eastern end of the sea wall in a masonry watch house, which is marked "Cavo sottomarino" on its side fronting the sea. Two white openwork ball beacons in line indicate its direction, and anchorage is prohibited in the locality.

Storm signals.—The signals are hoisted on a flagstaff near the principal lighthouse, San Gennaro Mole, at an elevation of 147 feet above the sea, and are identical with those made at other places on the coasts of Italy.

Time ball.—A time signal has been established on Maschio Angioino (Castello Nuovo). The signal consists of a ball, 65 feet above the sea, hoisted on a flagstaff. The ball is hoisted at five minutes before the signal, and dropped electrically from the Hydrographic Office at noon, standard mean time, corresponding to 23h. 0m. 0s. Greenwich mean time.

Should the signal fail or be inaccurate, the ball will be hoisted halfway up at $4\frac{1}{2}$ minutes, and lowered at 15 minutes, after the time of the signal, and the signal repeated at 1h. 0m. 0s. standard mean time.

Should the signal again fail, the ball will be hoisted halfway up and lowered as before, but the signal will not be repeated.

Position of the flagstaff, latitude $40^{\circ} 50' 15''$ N., longitude $14^{\circ} 15' 2''$ E.

A gun is fired at midday from Castello di Sant' Elmo, but it should not be used as a time signal.

Communication.—Naples has railroad communication to Brindisi, Taranto, Reggio, and all the capitals in Europe; tramways and funicular railroads up the cone of Vesuvius. The Circum-Vesuvian Railroad was completed in 1905; the new section runs from Naples to Pompeii, there joining the older part of the line. A new express railroad between Naples and Rome is in course of construction.

Numerous lines of steamers call here, among which are the steamers of the Orient Line between England and Australia, fortnightly each way, calling at Gibraltar, Marseille, Egypt, and Colombo; the British India Line from India to London every fortnight, from London to India, as inducement offers; the Cunard Line from Liverpool to the Mediterranean and return to Liverpool about twice a month; the Atlantic and Eastern Line from Liverpool to the Mediterranean and back about twice a month; the Ellerman Line from Liverpool to the Mediterranean and back about twice a month; the General Steam Navigation Co. from London to the Mediterranean and back about twice a month; the Wilson Line from Hull to the Mediterranean and back about twice a month; the Blue Cross Line about twice a month to Antwerp and London via Mediterranean ports; the Dundee Gem and Golden Cross Lines occasionally to London during fruit season; the Thomson and Phelps Lines occasionally to Montreal and New York during fruit season; the Prince Line, Mediterranean to New York about twice a month; the White Star Line to New York and to Boston, United States of America, fortnightly; the Anchor Line to New York about two or three times a month; the North German Lloyd Line to Southampton; the Hamburg American Line to New York occasionally; the German East African Line every fortnight to the East Coast of Africa, calling at all ports to Delagoa Bay, with extension to Durban, every four weeks, homeward to Hamburg; the Royal Hungarian Adria Line to Marseille, Fiume, Trieste, via Malta and Italian ports; the Fraissinet Line every week to Marseille; the Mixte Line every week to Marseille; and the Messageries Maritimes every fortnight to the eastern Mediterranean ports.

The Egyptian Mail Steamship Co. has regular sailings to Alexandria and thence to Marseille. In 1908 a direct weekly steamer to Malta commenced running, and the establishment of a line of fast steamers is intended. The Thomson Line has a service of direct steamers in the emigration traffic between Naples and Canada.

Besides these there is constant communication to all the principal ports in the Mediterranean by the Florio Rubbatino Co.'s steamers.

Hospitals.—The Naval Hospital of Piedigrotta has 500 beds, and the Military Hospital of La Trinità about 600 beds.

Pellegrini Hospital, with 130 beds, receives cases of wounds, contusions, and poisons, without regard to nationality, and gratuitously.

There is a hospital for incurables with 700 beds.

Cotugno Hospital has 200 beds for severe cases, at a daily charge for strangers.

Loretto Hospital has 300 beds for cases of boils, asphyxia, and poison; Le Pace Hospital, 84 beds for severe cases; and Gesù e Maria Hospital, 50 beds for special surgical cases.

Radio.—A radio station near Molo Angioino Lighthouse is always open to the public; the call letters are I C N.

The central telegraph office is always open.

The shore.—The large houses of Granili, now barracks, about 800 yards eastward of Molo Vittorio Emanuele II, are noticeable from seaward. The shore between Granili and Granatello, 3 miles southeastward, is a beach of dark volcanic sand, the 5-fathom curve being distant from 400 yards to 1,000 yards. The country inland is low. Several small piers extend off the shore. The shipbuilding works of Pattison, with several chimneys, lie between Granili and San Giovanni a Teduccio, about 1 mile southeastward, the campanile of which has a pyramidal spire. The buildings of Petrarsa foundry, on a small projection about 1 mile southeastward of San Giovanni a Teduccio, are conspicuous.

Directions.—Few directions are necessary for proceeding to the port of Naples, as the landmarks are conspicuous, the lights good, and the coast generally bold-to and free of danger. If coming from the southward, Capri Island (elevated 1,919 feet) will easily be distinguished and may be safely passed on either side. If from the northward or westward, Ischia Island (2,598 feet high) can be seen from 40 to 50 miles; it can be closely approached, and the passages on either side of Procida Island taken according to the directions previously given. Or, if entering the bay to the southward of these islands, then Vesuvius will be a good mark to steer for either by night or by day; proceed in with it bearing about 70° until Cape Miseno bears 294° ; then haul in for the lights at Naples.

Approach.—The following are good marks: Convento dei Camaldoli, on a hill 1,587 feet high, about $1\frac{1}{2}$ miles northwestward of the city, white and conspicuous. Collina di Capodimonte, surmounted by a palace, northward of the city, and the Astronomical Observatory near it, which can be distinguished from seaward by its white cupolas. Collina di Pizzofalcone, westward of the city, with large barracks on it, which extend to a short distance from the sea. Palazzo Reale and Castello Nuovo, near the root of Molo San Vincenzo. Two high chimneys at the electric power station westward of the Port office,

and the sharp steeple of Chiesa Carmine, northward of Porto Orientale.

Pilots.—The old lighthouse on Molo San Vincenzo is now the pilots' watchhouse, and pilots board vessels flying the pilot signal within about 2 miles from the end of Molo San Vincenzo.

The pilots are organized in one body for the service of the port of Naples and Golfo and Porto di Pozzuoli.

The pilots take vessels to a distance not less than 2 miles from the head of Molo San Vincenzo, and should take vessels to Pozzuoli at an increase of one-quarter of the charge.

Tides.—It is high water, full and change, in the port of Naples, at 9h. 12m.; springs rise 8 inches, neaps 4 inches.

Mount Vesuvius (ancient Vesuvio) has been for the last three centuries the most active volcano in Europe; it rises immediately over the sea at the head of the Gulf of Naples and is surrounded, except on the western side (which is washed by the sea), by the plain of Campania, its base being 30 miles in circumference. It rises gently to what is called the "first plain," which is about $\frac{1}{2}$ mile above the level of the sea and is about 5 miles in diameter. This plain forms the base of Mount Somma, the highest point of which is 3,630 feet. Mount Somma extends for about 3 miles in an irregular semicircle round the northern and eastern sides of the crater, the two summits being separated by the deep semicircular valley known as the Atrio del Cavallo, but on the west and southwest the fall is continuous though uneven from the crater to the shore. The height of the active cone has varied considerably of late years. The eruption of April, 1906, caused considerable changes, and the extreme height, since determined, is 4,012 feet. The height of the crater rim has also become more irregular, dropping to only 3,619 feet on the east-northeastern side, with a diameter of 2,379 feet in a north-northeastern and south-southwestern direction. On the northwestern side, at an elevation of 1,952 feet, are a hermitage and observatory, and round the foot of the mountain on all sides are populous villages, the land being richly cultivated and in places wooded.

There is a tramway service from Naples to Santa Maria di Pugliano, whence an electric railroad runs to the funicular line which ascends the cone above the observatory.

San Giovanni—Pier—Buoys.—A pier 185 yards long extends from the coast at about $\frac{1}{2}$ mile northwestward of this village. Two cylindrical mooring buoys are situated on each side of this pier.

Portici and Resina are two towns at the foot of Mount Vesuvius; the former, $3\frac{1}{2}$ miles southward of Naples, has a small mole, Port Granatello, and contains a population of about 13,000, who are principally engaged in fishing. Resina is only $\frac{1}{2}$ mile from Portici and is

built on the site of Herculaneum; it contains a population of about 1,600.

Light.—A fixed green light, elevated 39 feet above the sea and visible 6 miles, is exhibited from a small white building with circular base, 21 feet in height, on the molehead at Granatello. (See Light List.)

Buoy.—A red cylindrical warping buoy lies in the middle of the port.

Buoy carried away.—The warping buoy in the harbor of Port Granatello has been carried away (1916).

Torre del Greco, a town containing a population of about 35,328, stands on the shore at the foot of Mount Vesuvius, $1\frac{1}{2}$ miles southward of Resina; a part of the population is engaged in coral fishing and sponge fisheries working on the coast of Africa, and the banks in the channel between Sicily and Tunis. The number of boats employed in coral fishing was over 500, but has been reduced to less than 100, as the trade is decreasing every year.

The port, about 400 yards long and 300 yards wide, in which are depths of from 1 to $4\frac{1}{2}$ fathoms, is formed by a mole which projects in a southerly direction for 460 yards from the shore near Calastro Fort.

Harbor works.—The mole (breakwater) is being repaired and extended about 98 feet.

A mole is under construction in the eastern portion of Port Torre del Greco, commencing at Portosalvo and extending southwestward for a distance of 65 yards.

Buoy.—A red and white can buoy is moored about 55 yards from the head of the mole at Torre del Greco, to mark the works in progress for its extension. It is dangerous to pass between the buoy and the head of the mole.

Cape Bruno is 3 miles southward of Torre del Greco; on it is Scassata Tower, and from it the shore at the base of Vesuvius turns abruptly to the eastward for $1\frac{1}{2}$ miles to the commencement of a sandy beach where stands the town of Torre Annunziata. Midway between Torre del Greco and Cape Bruno and 1 mile inland is the convent of Camaldoli de la Torre on a peak 608 feet high.

Port Torre Annunziata.—The port is inclosed by moles, the eastern extending about 300 yards from the shore in a southwest direction, and the western projecting about 1,000 yards, gradually curving to the south and southeast, and inclosing depths of from 9 to 28 feet.

The entrance between the moleheads is 400 yards wide, but the navigable channel is reduced to a width of 250 yards by a shoal bank extending off the shore southeastward of Levante Mole.

Buoy.—A conical white buoy, with topmark, is moored 525 feet south of the head of the East Mole in $3\frac{1}{2}$ fathoms; this buoy must be left on the starboard hand when entering.

A black conical buoy with conical topmark is moored 171 yards $174^{\circ} 30'$ from the light at the head of the East Mole to mark the extremity of the shoal.

Lights—West Mole.—An occulting white light with red sector, elevated 39 feet and visible 12 miles, is exhibited from a red circular tower above a red circular building, 33 feet high, on the extremity of the West Mole at Torre Annunziata. (For sectors see Light List.)

East Mole.—An occulting green light, elevated 29 feet above the sea and visible 5 miles, is exhibited from a derrick on a red stone hut situated on the extremity of the East Mole (Molo di Levante).

Anchorage.—There is temporary fine weather anchorage in spring and summer, in 8 fathoms water, about 300 yards south-westward from the head of Molo di Ponente.

Vessels mooring in the port at Molo di Ponente and the outer part of Molo di Levante should drop their anchors well apart, and have plenty of cable out as the holding ground is only moderate, and a heavy swell sets into the port with southeasterly and southerly winds.

There is said to be a remarkable agitation of the water in the port an hour or two before the commencement of southeasterly winds.

Pilots.—There is a pilotage service, which extends 1 mile from the entrance to the port. When the pilot is retained on board from sunset to dawn he is entitled to an additional charge, and to a further charge if he goes with his boat to the vessel's moorings.

The town of Torre Annunziata stands at the head of the port, and the conspicuous gray cupola of Carmine rises on the slopes behind; below the cupola is a railroad viaduct; the gray cupola of Chiesa dell' Annunziata, a little to the southeastward, is smaller. The Campanile di Bosco Tre Case, about 1 mile northward of the town, is white, pointed, and conspicuous. The principal industries are flour milling, manufacture of alimentary paste, patent fuel, and small arms; the iron and steel foundries of Vesuvio are in the vicinity. The population is about 28,084.

Hospital.—There is a civil hospital, with 36 beds, which receives strangers at a daily rate, paid fortnightly in advance.

Communication.—There is railroad and telegraphic communication.

Coal.—In 1913, 271,492 tons of coal were landed at Torre Annunziata, and 42,000 tons of coal are usually in stock; it is brought off in lighters, of which there are 95 of 350 tons; 1,000 tons of coal can be put on board in 24 hours.

Supplies.—Provisions can be obtained, and water is taken into the town by an aqueduct from the sources of Fiume Sarno. Good drinkable water is obtained from floating tanks.

Pompeii.—About $1\frac{1}{2}$ miles 106° from Torre Annunziata are the ruins of the ancient city of Pompeii, overwhelmed by showers of scorïæ, pumice, and ashes during the eruption of Vesuvius in the year 79 A. D.

The shore.—From Torre Annunziata a sandy beach extends 4 miles 160° to Castellamare; about midway is the mouth of Sarno River off which at $\frac{1}{4}$ mile distant is a rock on which is Fort Revigliano. The railroad skirts the shore between the above-mentioned towns and there are ironworks and factories. The water is deep off the above beach, there being from 9 to 12 fathoms at $\frac{1}{2}$ mile from the shore.

Castellamare is situated at the southern extremity of the above-mentioned sandy beach 4 miles from Torre Annunziata, at the foot of the slopes of Mount San Angelo; it extends along the shore for a considerable distance, part of it occupying the site of the ancient city of Stabiæ, which was destroyed at the same time as Pompeii. The town possesses an arsenal, dockyard, building slips, and military hospital, and there are manufactures of linen, silk, cotton, sail cloth, and macaroni; in the neighborhood are mineral springs of high repute. The population is about 36,700.

The port.—Shelter is afforded by four moles, the center and largest one projecting 600 feet 12° from the occulting light on the inner end, thence 560 feet 40° ; the military port lies between it and a mole about 500 yards westward, and contains depths of from 3 to 10 fathoms; the mercantile port is formed on the eastern side of the large mole, between it and a smaller mole 600 yards eastward from it, and is the larger of the two ports, with depths of from 3 to 8 fathoms. Spacious quays extend along the shore between the moles. Southeastward of the smaller mole a new East Mole is being constructed.

Lights.—Root of mole.—An occulting white light, elevated 107 feet above the sea, and visible 15 miles, is exhibited from a red tower, 71 feet high, situated on battery at the inner end of the Central Mole.

Head of mole.—An occulting green light, elevated 30 feet above the sea, and visible 5 miles, is shown from a red iron crane on white square house, situated on the head of the Central Mole. (See Light List.)

East Mole—Light.—An occulting red electric light, visible 6 miles, has been established on the head of the new completed portion of the new East Mole, 570 yards 70° from the lighthouse, on the Central Mole.

The light is exhibited 27 feet above the water and 21 feet above the foundation from a skeleton iron tower.

A fixed red oil light, visible $4\frac{1}{2}$ miles, is also exhibited from the same tower.

Mooring buoys.—There are two mooring buoys in the mercantile and several in the military port. For positions, see chart.

Buoys.—In the western part of Porto Militare are five white buoys used for swinging torpedo vessels to adjust compasses. A mooring buoy lies in 11 fathoms water in the middle of the entrance to the port.

Pilots.—There is a pilot service at Porto di Castellamare, and vessels are boarded within a distance of 1 mile from the lighthouse.

Dredging is in progress in the Port of Castellamare. When the dredger is absent for depositing spoil, the moorings are attached to buoys, which should not be approached by vessels.

Stabia—Buoys—Lightbuoy.—On account of the prolongation of the outer mole four red buoys have been established as follows:

Two buoys 22 yards from the head of the mole and 68 yards on each side of the prolongation of the axis, and two buoys 109 yards from the head of the mole and 68 yards on each side of the prolongation of the axis.

A lightbuoy indicates the limits of the work.

Vessels must keep at least 131 yards from the head of the mole.

Anchorage.—The cathedral, with its dome and tower, is very conspicuous and a good mark to anchor by; a good berth is with the dome 115° in 14 fathoms about 400 to 600 yards from the molehead, or nearer the shore in 9 fathoms and the dome 127° .

Coal.—At the Royal Dockyard 3,000 tons of coal are kept in stock, and about 8,000 tons are imported annually. The commercial stock is about 600 tons. There is no coal wharf; 15 lighters are available and two tugs.

Dockyard.—Battleships of 10,000 tons have been built at Castellamare; there are four small and two large slips, the latter are about 400 feet in length. Vessels built here have their engines and boilers put in at Naples. At the dockyard is a wire and hemp rope factory. Two small slips are being constructed.

Supplies of all kinds can be procured in moderate quantities. On the beach at the southwestern end of the town is a good spring of water.

Water is supplied in lighters from springs.

Trade.—The principal imports are timber, coal, old iron rails, scrap iron, and wheat; the exports, building and paving stones, fruit, macaroni, etc. Iron is mainly imported from Great Britain and Antwerp.

Cape Orlando is $1\frac{1}{2}$ miles westward of Castellamare; at about 700 yards 262° of the cape is a shoal of 6 fathoms, with 27 fathoms between it and the shore.

Vico Equense.—About 2 miles westward of Cape Orlando are Gradelle and Scutolo Points, 700 yards apart; in the bay between Orlando and Scutolo is the town of Vico Equense, containing a population of about 13,000. It is surrounded by olive groves and beautifully situated at the mouth of a lovely valley, bounded by bold cliffs; in these cliffs is a natural arch named the "Bridge of Vico," through which the sea dashes in bad weather, making a tremendous roar.

Cape Sorrento is bold and has a tower on it; the coast between the cape and Gradelle Point forms an open bay, in the southwestern corner of which is the town of Sorrento; the shore of the bay is steep but flat at the top forming the richly cultivated plain of Sorrento, sheltered by lofty mountains in the form of an amphitheater; a great number of ancient subterranean cells are found near the shore. On the eastern side of the bay is the town of Meta.

Measured distance.—A distance of 119,068 feet has been measured, for ascertaining the speed of vessels, westward of Cape Sorrento. The running line is Casa Cosenza, on Monte Sant' Angelo, in line with an old telegraph post on Monte Sant' Angelo a Tre Pizzi, 90° . The western limit is Punta Sant' Angelo, Ischia, in line with Monte Epomeo, Ischia, 3° ; and the eastern limit is Scoglio Vervecce in line with Torre Cala, 185° . There are depths of from 412 to 66 fathoms on the course.

Tunny fishery.—Tunny nets extend from the eastern side of the cape, in a northeastern direction for 197 yards.

Torre Sergia, square, but not conspicuous, is on a rocky point, about 800 yards southwestward of Cape Orlando. The mineral and sea bathing establishments about $\frac{1}{4}$ mile southward of the tower are noticeable.

The convent of San Francesco, nearly $\frac{1}{2}$ mile southward of Torre Sergia, is 935 feet above high water, and isolated in the midst of woods; its cupola and campanile are white and conspicuous.

La Marina di Vico Equense is a little sandy beach on the shore of a little bight, about $\frac{3}{4}$ mile southward of Torre Sergia. On its western side is a small high point, southward of which is Vico Village, situated in the midst of woods and olives, with a fine battlemented castle at its southern end.

Scoglio Santa Margherita, about 100 yards northward of the point westward of the Marina, is rather high.

West of Vico Village is a sandy beach, within which is the valley of Rio d'Arco; the head of the valley is crossed by a large bridge on arches, which carries the tramway to Sorrento.

Punta di Scutolo.—The headland of Punta di Scutolo, at the western end of the beach, is rocky and high; Punta Gradelle, its western extremity, is surmounted by the church of Santa Maria delle Grazie, 705 feet above high water, red, and conspicuous.

La Marina d'Alimari (Alinuri), on a beach immediately southward of the high land of Punta Gradelle, is marked by a lime-kiln, two cylindrical towers, and the electric tramway station.

Il Porticciuolo di Meta, a little farther southward, is sheltered from the northward by a curved mole, westward of which a spit, with $1\frac{1}{2}$ feet water, extends seaward 150 yards; the port is only suitable for boats. The high rocky point southward of the port is bordered by a shoal bank.

Punta di San Francesco, nearly 1 mile southwestward of Meta, is high, rocky, covered with vegetation, principally pine trees, and surmounted by a long wall and a quadrangular battlemented turret.

The shore from Punta di San Francesco trends west-southwestward $\frac{3}{4}$ mile to Porto di Sorrento; it is rocky, and rises almost vertically to a height of about 165 feet, the land within being a high plain extending to the base of the mountains.

Sorrento (ancient Syrentum) is situated on the side of a hill surrounded by medieval walls and defended by small outworks; it contains a population of 7,500. It is remarkable for its industry in inlaid work, silk stockings, scarfs, ribbons, etc. In the town and neighborhood are many ancient Roman ruins.

The water is deep over the bay, especially off Sorrento, where there are 20 fathoms at 200 yards from the shore. Anchorage, however, may be had in 7 or 8 fathoms off the town of Meta; there are several rocks near the shore.

A breakwater is in course of construction at Sorrento, extending from the Customhouse Mole for 87 yards in a north-northeastern direction, in from 8 to 26 feet of water.

Light.—A small fixed green light is exhibited from the extremity of above breakwater, visible 1 mile.

Supplies.—Fresh meat, fish, fruit, milk, etc., are to be obtained at Sorrento.

Vervece Rock.—Lying 233° 1,900 yards from the tower on Cape Massa, is Vervece Rock, 33 feet above water; the rock is steep to all around, and in the channel between it and the shore, which is shoal 400 yards off, are depths of 17 and 20 fathoms.

Beacon.—A wooden cross painted dark green, 16 feet high, has been placed on Vervece Rock.

Supplies.—Provisions can be obtained, and there is a constant flow of water from a fountain about 50 yards from the south shore of the port.

Communications.—Small steamers between Naples and Capri call twice daily each way. There is an electric tramway to Castellammare and telegraphic communications.

The coast from Cape Massa trends south-southwestward $3\frac{1}{2}$ miles to Campanella Point, and is high, bold, and cliffy; Massa Point, southward of the cape, has a tower on it, and between this point and Campanella Point are three towers at nearly equal distances from each other. Massa Lubrense, a straggling and populous town, stands on the high ground immediately northward of Massa Point; fronting the town is a sandy beach, off which is a depth of 5 fathoms at 300 yards distance. There is a small landing pier, and the town are many ancient Roman ruins.

Semaphore.—On Monte Corbo, near Cape Massa, is an electric semaphore station, 794 feet above the sea, by which passing vessels can communicate. The buildings are painted in black and white checkers.

Campanella Point (ancient Minervum Promontory) is high, bold, and steep-to, there being from 50 to 70 fathoms $\frac{1}{4}$ mile from the shore; on the point are several ancient tombs and other ruins. A small bight is formed on the eastern side of Campanella Point, in which the water is very deep. Mount St. Costanzo, 1,598 feet high, rises immediately over the head of the bight, $1\frac{1}{4}$ miles from the point; the hills in the vicinity are covered with myrtle and olive trees. Mont Alto is a lofty headland forming the eastern point of the bight; on its eastern face, over the cliffs, is a tower, and off the point is a small rock above water.

Distress signals.—Distress signals have been established at Campanella Light Station in the vicinity of Minerva Tower.

Light.—An occulting white light, elevated 100 feet above the sea and visible 13 miles, is exhibited from a red square building 18 feet high near Minerva Tower, on Campanella Point.

Capri Island, the eastern point of which (lo Capo) lies $262^{\circ} 2\frac{1}{2}$ miles from Campanella Point, is about $3\frac{1}{2}$ miles in length (70° and 250°) and varies from $1\frac{1}{2}$ to $\frac{1}{2}$ mile in breadth; its surface is mountainous, the eastern and western ends being high, but between them is a low neck of land. The western end of the island is rocky and inaccessible from seaward, its highest point, Mount Solaro, being elevated 1,919 feet above the sea; the communication between this steep, rocky mass and the lower ground is by means of a flight of 535 steps cut in the limestone rock of which the island is chiefly composed. The southeastern end also rises in elevated precipices, the highest point being 896 feet above the sea; the ground, though rocky, is well cultivated and produces grain, fruit, oil, and wine, and on the low ground are fig, almond, orange, and olive trees, myrtles and vines. The coast is bold, precipitous, and inaccessible, except in two places,

and is perforated with several grottoes, one of which, the celebrated Grotta Azzura, so called from the apparent bright blue color of the interior, is about 180 feet long, and can only be entered by a boat in calm weather.

The climate of the island is pleasant throughout the year, being free from the climate extremes experienced on the mainland, and is healthful, being quite exempt from malaria and other intermittent fevers.

Lo Capo, the eastern point of the island, has a small but high rock off it, and on the cliffs above are considerable ruins; between lo Capo and Tragara Point, the southeastern extremity, the coast is formed of inaccessible cliffs; off Tragara Point are the Faraglioni, three high rocks, one of which is perforated. The shore is steep to all around and may be safely approached to within 400 yards in any direction.

The town of Capri (ancient Capræ) is situated in about the center of the low ground, and contains a population of about 4,000. The landing place on the northern side is at the Marina of Capri, about 1 mile westward of lo Capo, where there is a short mole; this mole is to be extended in a northerly direction for 100 yards, with an elbow extending to the eastward, thus forming a small port, which ought to be completed in two years' time; there is also another landing place on the southern side of the island. The only other village of note is Anacapri, on the northern slope of Mount Solaro, with a population of about 2,369.

An electric lift has been established from the beach to the village at the top of the hill; the electric-light station is a flat-roofed building near the village. A funicular railroad has been constructed connecting the landing place at the Marina with the Piazza. There is telegraph and telephone communication between the villages of Capri and Anacapri. The population is about 7,072.

Porto.—A mole extends about 250 feet seaward from the coast in front of the houses of the Marina, and then turns about 380 feet to the eastward. There are depths of from 25 to 12 feet in the northern part of the port thus formed, whence the depth decreases gradually to the shore.

Lightbuoy.—A black lightbuoy exhibiting a fixed red light is moored near the end of the mole.

Semaphore.—On the southeastern part of the island is an electric semaphore 896 feet above the sea, by which passing vessels can communicate. The buildings are painted in black and white checkers.

Supplies.—Provisions in moderate quantities can be obtained from the town of Capri, and good water from a fountain at the Marina.

Communication.—Steam vessels run twice daily to and from Naples, calling at Massa, Sorrento, Meta, and Vico Equense. A funicular railway runs from the Marina to the town of Capri.

Light.—From an octagonal red tower over gray dwelling, situated on Carena Point (the southwestern extremity of the island), elevated 238 feet above the sea, a fixed and flashing white light, visible 22 miles, is exhibited.

The coast from Marina di Capri trends east-northeastward about 1 mile to Lo Capo, the northeast point of the island. The church of Santa Madonna del Soccorso, 1,115 feet above high water, is on the summit of the northeast part of the island, and a bronze statue on a high square pedestal shows well when the sun shines on it.

The south coast from Punta Carena trends eastward $1\frac{1}{2}$ miles to Punta Ventroso, and is high, steep, and craggy, and it continues so to Marina Piccola, about $\frac{1}{2}$ mile farther northeastward, westward of which the land suddenly falls. Sirena di Mulo is a remarkable rocky projection, like a broad mole, which extends southward in front of a group of fishermen's houses named Marina del Mulo, or Marina Piccola di Capri; there is a mule track from the Marina to Capri town. Westward of La Sirena is a small beach protected by a line of rocks. Eastward of the Marina the coast rises, and attains in a short distance a height of 820 feet; this height is surmounted by the ruins of a castle. Scoglio Unghia Marina, close off the coast southward of the castle, is of the same color as the rocky land, and shows badly. The coast from near the ruins trends southeastward about 800 yards to Punta Tragara.

Marina Piccola is visited only by the steamers from Naples when strong northerly winds prevent communication at Marina di Capri. These vessels then anchor in from $4\frac{1}{2}$ to $5\frac{1}{2}$ fathoms water, weeds, southwestward of La Sirena.

Punta Tragara is the extremity of a small, high, conical peninsula. I. Faraglioni are two high, conical, pointed islets about 200 yards southward of Punta Tragara; the southern islet is the larger and higher, and the northern one is pierced, east and west, by a large natural arch, through which boats can pass. The water around Punta Tragara and I. Faraglioni is deep.

Anchorage.—There is anchorage, except with northerly winds, about 200 yards off the beach of the Marina, in depths of from $5\frac{1}{2}$ to 8 fathoms.

Telegraph cable.—The cable from Cala Mitigliano is landed eastward of the houses of the Marina; its direction is marked by the alignment of a notice board, marked "Divieto d'Ancoraggio," and a pole surmounted by a ball marked "T."

The Bocca Piccola, the channel between Capri Island and Campanella Point, is $2\frac{3}{4}$ miles wide; the water in the channel is very deep and the shore on both sides may be closely approached.

A submarine telegraph cable is laid across the Bocca Piccola from Calato Point (Capri Island) to Cala Mitigliano, northward of Campanella Point. Its direction is indicated by a placard, on which is printed "Divieto d'Ancoraggio" (anchorage prohibited), in line with a red pole with large white ball, on which is the letter T.

The Gulf of Salerno (ancient Pæstanus Sinus), between Capri Island and Campanella Point on the north and Cape Licoso on the south, is 32 miles wide and about 15 miles deep. The northern shore from Campanella Point to the town of Salerno is bold and precipitous, thence a nearly straight sandy beach trends $155^{\circ} 22'$ miles; the southern shore is high, cliffy, and, except off Cape Licosa, is steep-to.

Galli Islets (ancient Syrenusæ), lying 5 miles 84° from Campanella Point, is a small group of three islets, the largest (Galli) being the easternmost; it is about $\frac{1}{4}$ mile in length, covered with brushwood, and has a tower on its summit. The two smaller islets (Castellucia and Rotonda) lie a short distance to the westward. Vivaro Islet, off the west side of which shoal water extends for nearly $\frac{1}{4}$ mile, lies $1\frac{1}{2}$ miles 273° from the tower on Galli Islet. Nearly 1 mile 284° from Vivaro Islet and 300 yards from the shore, is a high rock or islet named Isca; there are from 20 to 33 fathoms water between it and Vivaro.

Two rocky patches, one of $2\frac{1}{2}$ fathoms, the other of 3 fathoms water, lie to the westward of Galli Islets, the former 700 yards 270° from the tower, the latter 1,800 yards in the same direction. There is a depth of 36 fathoms between the patches.

Positano, $5\frac{1}{2}$ miles eastward of Torre Forca, is built, in amphitheatre, in a wide valley lying between Monte Comune, 2,877 feet high, about 1 mile westward, and Monte Sant' Angelo a Tre Pizzi, 4,734 feet high, nearly $1\frac{1}{2}$ miles northeastward; it is the only large village near the sea between Punta della Campanella and Capo Sottile. There is a church with a green cupola in the village, and eastward of it is a noticeable tower, the color of which is the same as the rocky spur on which it is situated. The Marina is on a projection which has a small gravel beach on each side; a road rises from it, cut in the rocky side of the mountain.

Anchorage can be obtained, in 7 fathoms water, about 200 yards off the village, but it must be left on any indication of fresh winds from seaward.

The coast from Marina di Positano trends southeastward $2\frac{1}{2}$ miles to Capo Sottile; it is steep and rocky, backed by mountains, which decrease somewhat in height towards the cape. Vettica Maggiore, a village, is situated on the western slopes of the hills northward of Copo Sottile in the midst of vineyards; the church, with a cupola and campanile, is noticeable.

Cape Sottile, a bold and prominent headland, is the termination of a spur from Mount San Angelo; on the slope of the hill over the cape is the town of Prajano. About $2\frac{1}{2}$ miles northwestward of the cape is the town of Positano, on the shore of a small bay at the foot of the steep slopes of Mount San Angelo, which is 4,734 feet high; there are depths of from 8 to 10 fathoms at $\frac{1}{4}$ mile from the shore. Off Cape Sottile there is a depth of over 100 fathoms at $\frac{1}{4}$ mile from the shore.

Tunny fisheries.—Tunny nets are laid down from 380 to 981 yards from the shore at Nerano, Prajano, St. Agnello, Conca Point, and Tumolo Point.

Tunny nets are laid about 1,100 yards southeastward from Conca Marini, northeastward of Capo di Conca, with a width of about 650 yards; two buoys with flags mark the nets by day, and two white lights at night.

Amalfi.—Two miles eastward of Cape Sottile is Conca Point, between which and Cape Orso the coast forms a bay, on the shore of which are situated the villages of Amalfi, Minori, and Majori. Amalfi contains a population of about 7,000, and was formerly an important commercial Republic; it contains several paper mills, soap and macaroni manufactories, a cathedral, and several relics of its former opulence. It is a favorite winter resort of the Province of Salerno.

Minori stands at the head of the bay, and a short distance eastward of it the larger village of Majori; above the village are the old castle of St. Nicola and the ruined monastery of Calmadoli, both conspicuous from seaward.

Porto Amalfi is situated within two moles, one extending in a slight curve 275 yards eastward from the shore, and the other extending 45 yards southward from the shore a little northeastward. There is a depth of from $4\frac{1}{2}$ to 5 fathoms inside the southern molehead, and $1\frac{1}{2}$ fathoms about 25 yards from the gravel beach which forms a good landing place. Southeasterly winds send a nasty sea into the port, but they are rare and of short duration, shifting in a squall to the southwestward.

Lights.—An occulting white light, elevated 37 feet and visible 9 miles, is exhibited from a post, 8 feet high, on the molehead at Amalfi. Reported not to be visible full distance.

A fixed green electric light, visible 4 miles, is erected on the extremity of the stone jetty which extends 44 yards 170° from a point located 540 yards 238° from Amalfi Tower. The light is exhibited from a wooden pole, about 20 feet high, painted green.

Buoy.—A gray cylindrical warping buoy lies in the port between the moleheads.

Supplies.—Provisions can be obtained, and good water procured from a fountain near the beach; water for boilers and washing can be taken at the mouth of Fiume Canneto, which flows through the town.

Communication.—Steamers running between Naples and Messina call weekly. There is telegraphic communication.

Atrani, a town with a population of about 2,000, is close eastward of Amalfi, and backed by a steep hill, terminating in a point on which is Torre d'Atrani; it is partly obscured from seaward by a high viaduct which carries the road.

Minori is at the head of the bay, and a short distance eastward of it the larger village of Majori. The shore from Majori to Capo d'Orso is high.

Cape Orso is a broad headland, on which is a tower and lighthouse; the eastern point of the cape, named Tumolo Point, has off it a rock awash. Strong currents are said to set round the cape.

Light.—From a red octagonal lighthouse the lantern, 5 feet high, near white dwelling, is situated on Cape Orso, at an elevation of 219 feet above the sea, a flashing white light is exhibited. The light is visible 15 miles.

Tunny fishery.—Nets extend 500 yards southeastward from the shore at Citara.

Fuente Point Light.—An occulting white light, elevated 85 feet above the sea, and visible 13 miles, is exhibited from a red lantern, 5 feet high, near a dwelling on old fort on Fuente Point, $1\frac{1}{4}$ miles northeastward of Cape Orso. (See Light List.)

Vietri.—The small town of Vietri stands on the beach 1 mile westward of Salerno and about 1 mile northeastward of Punta di Fuente on a high point at the foot of Monte Liberatore, $\frac{1}{2}$ mile to the northward and 1,516 feet high. The cathedral has a cupola and a slender campanile. Torre Crestarella, reddish and quadrangular, is on a low rock near the sea eastward of the town. The population of the town is about 8,400.

Two Brothers Islets (Scoglio due Fratelli), about 400 yards southwestward of Torre Crestarella, are close to the coast and above water.

Salerno (ancient Salernum), a city with a population of about 42,315, stands on the beach and partly on the slopes of lofty hills, 4 miles to the northeastward of Tumolo Point; its streets are narrow and gloomy, and it contains a cathedral, governor's and archbishop's palaces, several monasteries, library, hospital for seamen, etc. On a hill over the town are the extensive ruins of a castle and other ancient buildings. There are cotton weaving, spinning, printing, tannery, olive oil, glass, and macaroni establishments. The country around is fertile, presenting a range of hills covered with olive groves, orchards, and cornfields. The mean annual rainfall is 53.5 inches; most of the rain falls between October and April.

Communication.—Salerno, on the Naples, Metaponto & Brindisi line of railroad is an important military post.

Porto di Salerno is within a mole named Molo di Ponente, which extends about 500 yards southward from the shore, then east-north-eastward about 400 yards, and thence southeastward about 400 yards, the last section being named Molo Foraneo (Outer Mole).

A breakwater, to extend southwestward from the coast eastward of the port, is constructing.

Manfredi quay extends about 220 yards southward on the north-east side of the port; on it are the port office and general warehouses, and works are in progress for bringing the railroad on.

Shoal water extends from the shore on the north side of the entrance to the port, which is about 65 yards wide northward of the inner end of Molo Foraneo. The depths have been maintained by dredging at a depth of 16 feet in the entrance, and from 2 to 4 fathoms in the port, but the depths have altered (1915) and caution is necessary. Southerly winds send a swell into the port.

Breakwater under construction.—A new breakwater is being constructed eastward of the harbor, commencing at the shore line and extending in a southwesterly direction.

Buoys.—A red mooring buoy has been established in the inner part of this harbor and a warping buoy at the entrance.

Shoal.—A shoal, with a depth of 9 feet, lies on the edge of the bank on the northern side of the entrance, with the old breakwater light structure bearing 250°, distant 200 yards.

Lights.—On the extremity of the new mole, from a crane over an iron frame, an occulting red light is exhibited 26½ feet above the sea and 22 feet above the ground and visible 8 miles. A fixed red light, elevated 11 feet above the sea, is exhibited at the northeastern extremity of the old breakwater at Salerno, visible 4 miles over an arc of 200°, entirely inside the harbor.

From the new quay a fixed green light is exhibited, elevated 16 feet above the sea, and is shown from a stone hut 16 feet high, on the southwestern angle of the quay; visible 4 miles. (See Light List.)

Lightvessel.—A lightvessel is moored in about 16 feet of water southward of the old mole, and exhibits one flashing green light, elevated 19 feet above the sea and visible 4 miles.

The vessel is painted red, with black mast, and shows a green flag.

The navigable channel between the lightvessel and the salient angle of the new mole, on which is a fixed red light, is 90 yards broad and carries 21 feet of water. (See Light List.)

Trade.—About 200 vessels enter the port annually; the chief imports are coal, cotton, grain, wool, wood for building purposes, and alimentary paste; and exports—fruit, olive oil, vegetables, and wine;

most of the goods exported are sent overland, there being no direct communication between the landing stage and the railroad.

Supplies of all kinds are procurable, but water is scarce and indifferent.

Coal.—The port has no facilities for coaling, and no coal is maintained in stock, but possibly one firm might be able to supply a few tons.

Repairs.—Small repairs can be effected at the mechanical works in the town, and large repairs at Fratte foundry, about 2 miles from Salerno.

Tugs.—There are two small tugs.

Pilots board arriving vessels at a distance of 2 miles from the entrance to the port, and take outgoing vessels to a distance of 1 mile from the entrance, when the weather permits.

Life-saving station.—A rocket apparatus is stationed at the port office.

Hospital.—The civil hospital (San Giovanni di Dio) has 50 beds and receive foreigners at a daily charge.

Directions.—Keep about 50 yards off the northeastern side of Molo Foraneo, pass midway between the northwestern end of that mole and the lightvessel, and steer into the port. With moderate southwesterly winds care must be taken not to get more than 100 yards from the mole, but during strong southwesterly winds no attempt to enter should be made.

Anchorage.—The anchorage off Salerno is exposed to winds from the southward (between southwest and southeast). With offshore winds there is good anchorage in from 9 to 10 fathoms at about 1 mile from the shore, good holding ground. Vessels may anchor off Vietri in from 6 to 9 fathoms during strong west-southwest winds; moor with open hawse to the southwest.

The coast.—Southeastward 8 miles from the city is the mouth of the Tusciano River, on the left bank of which is a tower. Sele River (ancient Silarus) enters the sea on the northern side of a tower $6\frac{1}{2}$ miles southward of Tusciano Tower, after a course of 60 miles; shallow water extends nearly $\frac{3}{4}$ mile off the mouth of this river.

Pesto (ancient Pæstum), the ruins of a Phœnician or Etruscan colony, is about $4\frac{1}{2}$ miles southward of Sele River, and about $\frac{1}{2}$ mile from the beach; the ancient walls, which are nearly entire, are still standing, and are $2\frac{1}{2}$ miles in circumference; within them are the remains of several beautiful temples and other buildings and a modern church. Near the beach southward of the ruins is the tower of Pesto. At the termination of the sandy beach is San Marco Tower on a rocky point.

Agropoli Bay.—The small fishing village of Agropoli stands on a rocky point $1\frac{1}{2}$ miles southward of San Marco Tower and near the

small river of the same name; the land to the southward and eastward of the village is high. Eastward of the promontory is a high chimney, and in front of it is a long pier where large boats load with bricks. Cotton is grown in the neighborhood.

Between Pesto and Agropoli shallow water extends nearly $\frac{1}{2}$ mile from the shore.

Anchorage can be obtained, in about 8 fathoms, 1,200 yards north-northwestward of the promontory on which is the village, but it is open to winds between southwest and north.

Communication.—A railroad runs from Battipaglia, about 11 miles east-southeastward of Salerno, where it joins the railroad from Naples to Brindisi, to Reggio, and there are stations at Pesto and near Agropoli. There is telegraphic communication.

Cape Licosa is the southern extremity of the Gulf of Salerno and the western extremity of a range of high hills extending thence to the southeastward; on the cape is a tower, and off it is Licosa Islet connected to the cape by a reef of rocks, which also extends some distance westward from the islet.

Licosa Bank, of sand and rock, extends about $1\frac{1}{2}$ miles westward of Licosa Islet, where there is a depth of $3\frac{1}{4}$ fathoms, and 10 fathoms at 3 miles off. Other patches having a greater depth of water on them lie westward of the above bank.

Light.—A flashing white light, visible 12 miles, known as Granito Light, has been established on Licosa Islet, off Cape Licosa. (See Light List.)

Buoy.—A conical buoy, painted red, and surmounted by a staff, has been moored in $6\frac{1}{2}$ fathoms off the western extremity of the shoal part of Licosa Bank.

Punta dell' Ogliastro, 2 miles from Punta Licosa, is a small low and flat rocky projection, surrounded by foul ground; there is a square tower on it. Ogliastro village, northeastward of the point, is small.

Agnone village, on the coast, $2\frac{1}{2}$ miles southeastward of Ogliastro, is small, and there is an old tower in front of it.

La Madonna della Stella is a small white church on the summit, 3,707 feet high, of a dark conical mountain, $3\frac{1}{2}$ miles east-northeastward of Agnone.

Acciaroli village is on the rocky coast 3 miles southeastward of Agnone; here there is a large old square tower, and in front of it a line of dark rocks above water. There is a bridge with three arches at the southeast end of the village.

Torre Calco, nearly 1 mile southeastward of Acciaroli, is square, and Secca la Vecchia, a bank with $1\frac{1}{2}$ fathoms water, extends $\frac{1}{2}$ mile southwestward from the coast between. A rock awash lies near the tower.

La Punta is a little promontory, $1\frac{1}{2}$ miles eastward of Torre Calco, and there is a tower on it; Secco Gove Marino, with one fathom water, lies about 600 yards southwestward of La Punta.

The sea, except when smooth, breaks on all the banks just mentioned, and the coast should not be closed to less than 1 mile.

La Marina dei Pioppi is a small group of houses on the beach about 1 mile eastward of La Punta, and anchorage, sheltered from northwesterly to northeasterly winds, can be obtained off it. Torre dei Pioppi, on the high land eastward of the houses, is square and isolated.

The coast eastward of Pioppi becomes low, sandy, and backed by the high hills surrounding the valley of Fiume Alento.

The coast.—From Cape Licosa a high, exposed, and rocky coast extends southeastward for 22 miles to Cape Palinuro; the country inland is well cultivated and watered by small streams, and there are forests of oak and chestnut. On most of the projecting rocky points, as also on other commanding positions, are towers. The shore, which is in some places rocky and shoal, should not be approached nearer than 1 mile, at which distance there is a general depth of 10 fathoms.

Accioroli is $7\frac{1}{2}$ miles southeastward of Cape Licosa; 2 miles eastward of which is Punta Tower on a point from which a reef extends $\frac{3}{4}$ mile off. Pisciotta, a village with a railroad station, stands on the coast 8 miles to the southward; it has a trade in fruit and wine; about $1\frac{1}{2}$ miles beyond it are the ruins of a tower, said to be the tomb of Palinurus.

Weather warning.—The seamen of the locality state that the summits of the coast mountains, between Punta della Campanella and Salerno, seen covered with clouds, indicates bad weather from the southeastward.

Cape Palinuro.—Projecting to the westward is an elevated headland, rising from a low wooded ridge to a smooth rounded summit 675 feet high; on its western and southern sides are steep cliffs, but on its northern side is a sandy bight (named Port Palinuro) and village, defended by a small fort. Port Palinuro has a moderate depth of water, but the anchorage is exposed to westerly and northwesterly winds; it is well protected in other directions, and offers the best shelter along the coast for a considerable distance. Two streams flow into the bight on the southern side of the cape.

Light.—A group flashing white light, elevated 675 feet above the sea and visible 30 miles, is exhibited from a white octagonal tower above a white dwelling, 46 feet in height, situated on the summit of Cape Palinuro. (For arc of visibility see Light List.)

Wreck.—The wreck of a cutter, about 16 feet above water, lies sunk about 55 yards off Cape Palinuro. The wreck is unmarked.

Semaphore.—At 547 yards eastward of the lighthouse is a semaphore station, 676 feet above high water, on Punta del Gariglio, by which passing vessels can communicate.

Gulf of Policastro.—From Cape Palinuro the coast, which is composed of cliffs, trends 7 miles 125° to Iscolelli Point, on which is a tower, then 7 miles 45° to the village of Policastro, thence it curves to the eastward and southward, forming between the point and St. Ianni Island a deep bight named the Gulf of Policastro.

At 4 miles northeastward of Iscolelli Point is Spinosa Tower, and 1.3 miles farther eastward is Olive Tower.

Tunny fishery.—About 1 mile to the northward of Iscolelli Point, a tunny net extends 656 yards from the shore in an east-south-eastern direction.

Scario Anchorage.—Nearly midway between Spinosa and Olive Towers, is the town of Scario, off which there is anchorage in from 8 to 9 fathoms, with winds from the southwest.

Light.—On the rocks between Spinosa and Olive Towers is situated an octagonal red lighthouse, from which at an elevation of 79 feet above the sea is exhibited a fixed white light, showing a red flash. The light is visible from a distance of 13 miles. It is partly obscured. (See Light List.)

Policastro, Pyxus of the Romans, and the supposed site of the ancient colony of Buxentum stands on the sandy shore at the head of the gulf; it is now only a small village and the inhabitants are principally engaged in fishing; it possesses a Gothic cathedral, and there are also several ancient ruins in the neighborhood.

Anchorage.—Anchor in about 10 fathoms, good holding ground, with Fortino Prodesse in line with Torre Formicola, and about 300 yards eastward of the fort. The anchorage is good with southeasterly winds, but southwesterly winds send in a heavy sea, and it is open to the westward and northward; the shift of a cyclonic wind from southward to west or northwestward is dangerous here.

Winds.—In winter, south-southwesterly gales are frequent, and shift suddenly to the westward and northwestward; in summer, gales, called scossure, commence from the southeast and veer gradually to southwest and west.

When the summit of Monte della Madonna della Stella, or that of Monte Bulgaria, to the eastward, is covered with clouds, northwesterly winds are probable, but when the clouds spread around the mountain, leaving the summit clear, southerly winds are indicated.

Sapri (ancient Scidrus), a small town with a population of about 3,600, is situated on the shore of a small cove, 5 miles eastward of Policastro. A tower stands on each side of the entrance to the cove, within which is a depth of 3 fathoms, but the anchorage is exposed to southwesterly winds.

Light.—An unwatched flashing white light is erected on Punta Fortino, northern side of the entrance to Sapri, about 1,665 yards 329° from the tower on Capo Bianco. The light is named Pisacane.

The light is exhibited $44\frac{1}{2}$ feet above the sea from an iron column on a square tower, the whole $13\frac{1}{2}$ feet high and painted red and white in stripes, and is visible 12 miles. (See Light List.)

The coast.—From Sapri the coast trends to the southward to Cape Scalea, distant 15 miles; between are many small towns, and towers on the prominent point; highland extends the whole distance, and the Talago River enters the sea 3 miles southward of St. Ianni Islet.

Shoal.—A shoal named Seccadella Giumenta, with 4 feet water, is situated about $\frac{1}{2}$ mile southeastward of St. Ianni Islet.

Dino Island lies a little more than 6 miles southward of St. Ianni Islet; it is 213 feet high, about 700 yards in extent, and nearly connected to the shore by a ridge of rocks; on its western point is a tower.

Anchorage may be had on either side of Dino Island, but it is exposed to westerly winds; the southern side affords the best shelter in from 6 to 9 fathoms water, with a bottom of sand and weed. In Cala Nicolo, a small cove near a tower on the mainland about 1 mile southward of Dino Island, is excellent shelter for boats.

The coast from Capo Bianco trends southward 15 miles to Capo Scalea; between are many small towns, and towers on the prominent points; high land extends the whole distance.

Scoglio dello Scialandro, about 100 yards off Capo Bianco, is above water, and blackish in color.

Acquafredda, $2\frac{1}{2}$ miles southeastward of Capo Bianco, is a group of houses on high ground covered with olives. There are two viaducts on arches below and northward of the village, and a square tower on a hill to the southward. Near the coast, about 1 mile southward of the village, is a viaduct on ten arches. Torre Santa Venere, $2\frac{3}{4}$ miles southeastward of Acquafredda, is square, light yellow in color, and situated on a small projection which is surrounded by rocks.

Porto Maratea is a little cove about 1 mile southeastward of Torre Santa Venere, with some houses on the beach at its head; the shores on both sides are rocky.

The coast.—Capo Scalea is a bold headland with generally steep rocky coasts. Torre di Dino, circular and conspicuous, is on the western and highest point, 266 feet, of the headland; Torre della Petrosa, cylindrical and 340 feet above high water, is on the summit of the headland immediately southward of Capo Scalea.

Secca della Giumenta, southward of Torre della Petrosa and $\frac{1}{4}$ mile offshore, is two ledges of rocks almost awash.

Scalea town, about $1\frac{1}{2}$ miles southeastward of the cape, is a number of poor houses on the steep southern side of a hill, and there is an old castle above it; the population is about 3,150. Scoglio la Torre, on the beach southward of the town, is surmounted by a square tower and some houses; it is conspicuous.

The wide wooded valley of Fiumi Lao and Abatemarco lies southward of Scalea, the rivers being $2\frac{1}{4}$ and $3\frac{1}{2}$ miles, respectively, from the town.

Cirella Nuova village, situated on a small rocky projection 6 miles southward of Scalea, has a few houses amongst the olives.

Pier.—An iron pier extends off the beach to the southward of Cirella Nuova, and coasting vessels go alongside it.

Isolotto di Cirella, nearly 1 mile southward of the village, and about 600 yards offshore, is rounded, and surmounted by a square tower; there is a depth of 6 fathoms in the middle of the passage within it, decreasing to both sides, but a shoal bank extends about 60 yards eastward from the islet.

Diamante village is situated on a small high level point about $1\frac{1}{2}$ miles southward of the islet; a rocky bank extends a short distance off the point.

Capo Tirone, $3\frac{3}{4}$ miles southward of Diamante, is a conspicuous large rocky mass, within which is a square yellow house. Marina di Belvedere, southward of the cape, has a few houses amongst which are a brick kiln, some sheds, and a very high slender chimney.

Monte Montea, 5 miles east-northeastward of Capo Tirone, is 5,853 feet high and noticeable. Several rivers enter the sea from this coast, but the only one which has any importance is Torrente San Gineto, $2\frac{1}{2}$ miles southward of Capo Tirone; a little northward of its mouth is Castello del Principe, which is noticeable.

Capo Bonifati, 2 miles southward of the mouth of Torrente San Gineto, is marked by a remarkable greenish hill on which is Torre del Capo, circular and conspicuous.

The coast from Capo Bonifati trends southward 39 miles to Capo Suvero, and is steep, sandy, and generally bold-to; a ridge of high land extends along it; the streams which flow to the sea are small. Towns and villages lie on the coast and slopes; the district is generally fertile, producing wine, silk, oil, and fruits.

Cetraro village is situated on a steep hill on the southward side of the mouth of a stream $3\frac{1}{4}$ miles southeastward of Capo Bonifati.

Guardia-Piemontese, a small village about 4 miles southeastward of Cetraro, is perched on the top of a mountain, 1,689 feet high, and there is a small tower amongst the houses.

Marina di Fuscaldo, $3\frac{1}{4}$ miles southward of Guardia, has many houses and a white railway station. Torre di Fuscaldo, a little within and above the Marina, is circular.

Rocks.—A line of rocks above water extends from the beach in front of Torre di Paola, and a short distance southward and westward from it are some rocks under water; avoid anchoring off the tower.

Mole.—A mole projects 270 yards off the coast just southward of the railroad station at Paola, and is being extended 250 yards north-westward.

San Lucido village, $3\frac{1}{4}$ miles southward of Torre di Paola, is on the level top of moderately high land, which rises steeply from the beach; behind it is a conspicuous square building.

Belmonte village is on a small hill nearly $\frac{3}{4}$ mile inland; there is a little cupola amongst the houses. Torrente Verre flows to the sea on the south side of the village.

The coast from Salerno trends south-southeastward 22 miles, to Agropoli, and is a low sandy beach. Torre Aucellara, on the beach about $2\frac{1}{2}$ miles southeastward of Porto di Salerno, is large and square, with a light-colored house over it, and noticeable from its size.

Fiume Tusciano flows into the sea 8 miles south-southeastward from Porto di Salerno, and a little within the entrance on the left bank is Torre Tusciana (Tusciano), circular and surmounted by a white hut with a flagstaff; close southward of it are a large white factory and the few houses of Spineta.

Fiume Sele (ancient Silarus) flows into the sea $6\frac{1}{2}$ miles southward of Torre Tusciana, after a course of 40 miles; there is generally a depth of 6 feet in the mouth of the river, and the 5-fathom curve is about $\frac{1}{2}$ mile off it. About $\frac{1}{2}$ mile within the mouth and a little distance from the left bank are two cylindrical towers, the inner one having a hut on it.

Monte Soprano, about 4 miles eastward of Pesto, is 3,550 feet high, and $1\frac{1}{2}$ miles southwestward of it is Monte Sottane, 2,073 feet high, with Capaccio (Capoccio) village in the valley between.

Paola (ancient Patycos) is on the shore near a ravine, which is crossed by a fine bridge. It contains several churches, convents, and hospitals, and has manufactories of silk, woollens, and earthenware. The principal products are figs and chestnuts. The rearing of silk worms is the principal industry. A short distance northward of the town shoal water extends some distance offshore. Population 9,420. Steamers call here to Naples, and carriages leave for the town of Cosenza, 12 miles distant.

Fiumefreddo (ancient Bruzio) is surrounded by walls, and stands in the midst of a fertile country 7 miles southward of Paola. Behind it rises the peak of Mount Cocuzzo, 5,056 feet high and very conspicuous from seaward.

Isca Rocks are two high rocks lying $\frac{1}{2}$ mile offshore, 4 miles southward of Fiumefreddo, with deep water round them; the highest

is 38 feet high. On the shore abreast of them are the towns of Belmonte and Amantea; the latter, situated on a high rock, is defended by a fortress.

Formicola Rock lies $3\frac{1}{4}$ miles southward of Isca Rocks; it is small and only 2 feet above the water. Immediately northward of it and connected with the shore is a large, dark, rocky mass, with smaller rocks scattered around it; there is a depth of 30 fathoms a mile outside them. Thence to Cape Suvero, a distance of 9 miles, the coast is bold; several towers and villages stand on the shore and the hills recede farther from the shore. About midway is Caputa Rock, close to the shore.

The Gulf of St. Eufemia (ancient Sinus Terinaeus) lies between Capes Suvero and Vaticano. From Cape Suvero the shores of the gulf extend eastward and southward for about 21 miles to Safo Tower and are low and sandy; thence a rocky coast extends westward to Cape Vaticano. Wheat, Indian corn, and fruits are cultivated, and in some places the country is wooded. The district suffered greatly from the earthquakes of 1637 and 1783. "The town, which originally gave its name to this gulf, is said to have been swallowed by the earthquake of 1637, and its site is marked by a fetid lake. The present town of St. Eufemia is 2 miles from the sea, 4 miles eastward of Cape Suvero."

Except in the southern part of the gulf, there are no hidden dangers. Under favorable circumstances temporary anchorage may be had, but there is no secure shelter in the gulf; the best place is off Santa Venere on the southern shore.

Cape Suvero rises steeply from the beach to a small height; it is marked by the lighthouse, and also by Torre Spineta (Spineto), nearly 800 yards eastward and somewhat higher than the lighthouse. Monte Mancuso, 4,232 feet high, $4\frac{1}{2}$ miles northeastward of the Cape, and Falerna and Gizzeria villages on the slopes of the mountains nearer the sea are noticeable. The railway runs round the cape under and seaward of the lighthouse.

Light.—From a white octagonal tower above square dwelling on Cape Suvero, at an elevation of 141 feet above the sea, a fixed and flashing white light is exhibited. The light is visible 16 miles. (For arc of visibility see Light List.)

Mole under construction—Mooring buoy.—A concrete mole 65 yards long is being constructed in the northeastern part of the Gulf of St. Eufemia, in front of the Malta Bastion, in (approximately) latitude $38^{\circ} 55' 40''$ N., longitude $16^{\circ} 13' 05''$ E.

A red mooring buoy has been established on the prolongation of the axis of the mole in 4 fathoms of water.

NOTE.—Carried away, 1916.

Tunny fisheries.—Tunny nets are established in the Gulf of St. Eufemia at Mezzapria Tower and Pizzo; the nets extend more than 1 mile from the shore in a northwesterly direction. A net also extends about 1.1 miles off the shore at the mouth of the River Angitola.

The coast from Torre della Guardia to Cape Suvero, 9 miles to the southward, is bold.

About $1\frac{1}{2}$ miles from Torre della Guardia is the mouth of Fiume Oliva, which has a white gravel bed, and is crossed by an iron bridge. Torre San Giovanni, on the beach $\frac{3}{4}$ mile farther southward, is circular, with a house against it, and some houses around.

A small bank with $4\frac{1}{2}$ fathoms water, and from 11 to 20 fathoms around, lies $\frac{1}{2}$ mile off the coast, $1\frac{1}{2}$ miles southward of the mouth of Fiume Oliva.

Fiume Savuto flows into the sea, $2\frac{3}{4}$ miles southward of the mouth of Fiume Oliva; the mouth has well-wooded shores, and white low sandbanks; it is crossed by an iron bridge with three spans.

Torre del Casale, $1\frac{1}{2}$ miles southeastward of the mouth of Fiume Savuto, and nearly $\frac{1}{2}$ mile inland, is 500 feet above high water and conspicuous.

Torre dei Lupi, a truncated cone in shape, is situated on a rocky spur which extends to the beach, 2 miles southward of Torre del Casale.

Pizzo, a town containing a population of about 8,239, is situated on the shore within a small projecting rocky head; it is defended by a fort, and an active coasting trade is carried on from its small port. The country around is well cultivated.

The town is memorable as the last scene in the life of Murat, King of Naples, who was buried in the church.

Pizzo—Buoys.—A mooring buoy lies off Pizzo in 8 fathoms of water, 1.6 miles 53° from Santa Venere Light and 450 yards from the shore; at $\frac{1}{2}$ mile farther northeastward is another buoy.

Anchorage.—The bottom is hard sand and not good holding ground, but anchorage can be obtained in depths varying from 10 to 5 fathoms.

Santa Venere.—2.5 miles beyond Pizzo is the tower and fishing port of Santa Venere, where vessels are protected by a curved mole, extending in a northeastern direction. There is a depth of 5 fathoms 500 yards northward of the end of the breakwater; the curve of 5 fathoms then trends to the southwestward at that distance westward of and nearly parallel to the breakwater; within this line a shoal extends off the shore for 600 yards with $2\frac{3}{4}$ fathoms at its extremity, which is 400 yards 290° from the light.

A small mole, 33 feet wide and 446 feet long, is in course of construction, the inner end is 727 yards 228° from the curved mole.

In bad weather the sea breaks on the shoal ground near the extremity of the mole; large vessels entering the port should pass about 600 yards northward of the light, and proceed for the anchorage.

The entrance to the port has been dredged.

Mooring buoys.—Two mooring buoys are situated as follows: One 220 yards 136° and the other 200 yards 90° from the lighthouse on the molehead.

NOTE, 1914.—The mooring buoy, formerly moored 200 yards 90° from the lighthouse on the mole, has been moved 220 yards to the eastward. It is not safe for vessels to use the buoy in its present position.

Light.—On the northeastern end of the mole an occulting green light, elevated 41 feet above the sea and shown from a wooden mast 28 feet in height, is exhibited, visible 4 and 5 miles respectively. (See Light List.)

Tunny fishery.—Tunny nets extend 1.4 miles from the shore in a northwest direction at about 1 mile west-southwest of Santa Venere Light; also 1,100 yards from the shore in a north-northwest direction at $1\frac{1}{4}$ miles westward of Briatico.

The coast from Capo Cozzo trends west-southwestward 9 miles, to Capo Vaticano; it is rocky and clear at the distance of 400 yards.

Tropea.—The town of Tropea, $4\frac{1}{2}$ miles westward of Capo Cozzo, is situated 200 feet above high water on high tufaceous ground, which falls steeply to a wide sandy beach; the country around is cultivated and wooded. The town, which is partly walled, has a cathedral, several churches and convents, and manufactories of linen goods and counterpanes; kaolin is extracted from the mountains around; there are also active tunny and anchovy fisheries.

On the beach in front of the town are two large tufaceous masses; San Leonardo, the eastern one, is flat and cultivated on the summit; Isola, the western one, has a large cave, and is surmounted by a shrine; it is connected to the town by a viaduct on arches.

The mean annual temperature at Tropea is 64° . The average annual rainfall is 27.3 inches; the most rain falls from October to February, inclusive.

Quay.—The construction of a landing quay, with a protective mole, off San Leonardo rock, is in progress.

The coast between Tropea and Capo Vaticano is generally a narrow sandy beach with rocky cliffs inside it, and well cultivated hills at the back. There are several towers on the beach, and villages on the hills.

Torre Bali, on the edge of a high cliff, $2\frac{1}{2}$ miles westward of Tropea, is small.

Scoglio Vadera, about $1\frac{1}{4}$ miles southwestward of Torre Bali, and 700 yards offshore, is small and dark; it is steep-to, and the passage inside it is clear, with 6 fathoms water in the middle.

Bank.—A bank, about 2 miles in extent within the 100-fathom curve, with a least depth of 40 fathoms and from 125 to 224 fathoms around, lies about 5 miles northwestward of Torre Bali.

Safo Tower stands on a rocky point $3\frac{1}{2}$ miles 276° from Santa Venere Tower; between these towers the shore forms a bight which is partly filled up by rocks. A short distance inland is the village of St. Pietro di Bivona, near the site of the once important colony of Hipponium, of which the ruins still remain.

Cape Zambrone, 2 miles to the westward of Safo Tower, has a tower on it; close off it is the Islet of Galera, and midway between it and Safo Tower is the village of Briatico, situated on the left bank of a stream. Rocks skirt the shore between Cape Zambrone and Safo Tower, but there is a depth of 10 fathoms at 1 mile off.

Monteleone is situated on a commanding position 4 miles 138° from Safo; it is crowned by a castle, and has a population of about 10,310; it contains silk manufactories, the country around being very fertile and producing quantities of silk.

Leonardo Rock.—Off the point westward of the town is the conical rock of Leonardo, perforated with caverns.

Cape Vaticano.—The coast between Tropea and Cape Vaticano is rocky and foul; off the cape, which is 410 feet high, are the Vadero and Mantineo Rocks. The former, off the north point of the cape, lies 700 yards from the nearest shore; the latter lies 400 yards from the shore, $1\frac{1}{4}$ miles southward of Vadera, and between both rocks and the shore are passages through which boats can pass. Two miles northward of Cape Vaticano the cliffs are 240 feet high; on the summit is a semaphore station.

Light.—On Cape Vaticano, from a circular white turret adjoining dwelling, at an elevation of 354 feet above the sea, is exhibited a flashing white light visible 23 miles. When within a distance of 10 miles the light appears as fixed white and flashing, exhibiting one flash every minute; outside that distance as a white flashing light only. (See Light List.)

Golfo di Gioja extends about 4 to 6 miles east-southeastward from its entrance between Cape Vaticano and Capo Paci, 23 miles south-southwestward. The water in the gulf is deep to a short distance from its shores, and there are no ports of refuge. The shores are mountainous at the extremes, but low and sandy in the central part; several rivers and torrents flow into the gulf, and there are many villages on the shores and the hills within.

The coast from Cape Vaticano trends southeastward 7 miles, and is high cliffs.

Secca del Monaco is the outer of several rocks, which encumber a small bay immediately southeastward of the cape; it is about 400 yards offshore, and within but near the 5-fathom curve.

Fortino di Santa Maria is on a point $1\frac{1}{2}$ miles southeastward of the cape; a rocky spit nearly awash and terminating in Scoglio Galia, a blackish rock above water, extends 300 yards off the point.

Torre Joppolo, battlemented, with a house behind it, stands on the steep rocky coast, $4\frac{1}{2}$ miles from Cape Vaticano.

Nicotera, a large village, is about 2 miles southeastward of Torre Joppolo and on the slope, 690 feet high, of Monte Poro, the summit of which 2,323 feet high, is about 3 miles to the northward. The village has an old palace, and is conspicuous.

A sandy beach trends southward about 9 miles from Nicotera, and inside it is the extensive and slightly elevated plain through which flow the united Fiumi Mammella and Messina.

Gioja (Gioja Tauro), $7\frac{1}{2}$ miles southward of Nicotera, and 1,400 yards inland, is a town with a population of about 5,760; a white square campanile, and the red-tiled roofs of many of the houses are noticeable.

Marina di Gioja, on the beach, has a few houses, to the southward of which is a large oil and sulphur establishment with two high chimneys. The Marina is frequented by small craft, which are hauled up on the beach; wood charcoal, building and fire wood, and wine are exported.

Buoy.—A red mooring buoy lies in $6\frac{1}{2}$ fathoms water about 350 yards off the beach.

Anchorage.—Steamers in fine weather anchor off the beach; there is a depth of 6 fathoms at a distance of about 300 yards.

Supplies.—Provisions can be obtained; water is brought from the mountains in pipes and is good. There is no coal.

Communication.—Steamers between Naples and Messina call weekly, and those of another line call about every 15 days. There is railroad and telegraphic communication.

Life-saving station.—A rocket apparatus is stationed at Gioja.

The shore.—Fiume Petrace flows into the gulf about $\frac{1}{2}$ mile southward of Marina di Gioja, and is crossed, about 1,600 yards within its mouth, by a long iron bridge. The shore from the mouth of the river trends southward 4 miles to Cape Barbi, and becomes high and rocky.

Cape Barbi is mountainous, and its summit is covered with olives; Palmi village is on the high ground within it. Monte Sant' Elia, 1,900 feet high, is southward of the village.

The shore from Cape Barbi trends southward $4\frac{1}{2}$ miles to Gagnara, and is high and cliffy.

Torre Rosci, $3\frac{1}{2}$ miles southward of Cape Barbi and situated on a rocky hill which separates two light-colored sandy beaches, is cylindrical.

The coast again increases in height, with a clifly shore, and thus it continues for 9 miles to the town of Bagnara.

Bagnara, a town with a population of about 11,140, is built on the site of the ancient Portus Balarus; there are two remarkable viaducts behind the town. Anchorage off the town is unsafe, and the currents are strong. Westward of the town is a ravine, whence cliffs extend to the town and Castle of Scilla.

Trade.—The principal articles of export are olive oil, wood, and charcoal. No imports are shown, as they pass through the custom-house at Messina, and are consequently included in the Sicilian returns.

Telegraph cable.—A telegraph cable is landed southwestward of Bagnara, and four notice boards on the beach indicate the prohibited anchorage.

Cape Peloro.—An occulting white light, elevated 85 feet above the sea, and visible 12 miles, is exhibited from a tower on an old fort, 72 feet in height, situated on Cape Peloro, the northeastern extremity of Sicily.

Winds.—In summer the prevailing winds in Gulf of Gioja are northwesterly; these winds set in about 10 a. m. and last until sunset; although moderate they raise sufficient sea sometimes to prevent communication with the shore; at night there is an easterly breeze with a smooth sea. The other winds in this season, which are exceptional, attain, especially southwesterly winds, a moderate force, and do not last more than two or three days. From October to April, southwesterly and northwesterly winds prevail, accompanied by a heavy sea. Southwesterly winds are very strong and persistent, and attended by hail and rain; with these winds most of the shipwrecks in the gulf occur. Southeasterly winds, although sometimes very strong, do not raise much sea.

Tidal streams.—The streams in the gulf set northward during the rising tide, and southeastward during the falling tide, at a rate which varies from 2 to 3 knots in the southern part of the gulf, and diminishes gradually to the northward. The inshore streams follow the streams in the Strait of Messina and turn with them. An hour after the cessation of the northgoing stream, a counter stream commences and sets northward on the shore from Cape Paci to Cape Vaticano; it is named Bastardo della Montante. This stream, which has but little width off Cape Paci, continues along the shore until near Cape Vaticano, gradually losing in rate, but increasing in width, so that its rate, which sometimes reaches 3 knots between Scilla and Bagnara, is greatly reduced at Nicotera, and is very feeble at Cape Vaticano. There is no counter stream during the falling tide. The

streams are subject to irregularities, especially with strong winds between southwest and northwest, when great caution is necessary in sailing vessels when approaching the shore. Further observations are required on these streams.

The coast from Cape Paci trends west-southwestward $3\frac{1}{2}$ miles to Punta Pezzo, and is a beach, broken by the mouths of several streams, rising a short distance inland to well-cultivated hills. Torre Cavallo, on a rocky spur, near the sea a little more than 1 mile from Cape Paci, is circular, with a long wall on arches westward of it. Farther southwestward, on the extremity of the rocky spur, are the remarkable ruins of Castello di Alta Fiumara, and a large yellow building named Casa Porticello. Alta Fiumara flows into the sea $\frac{1}{2}$ mile southwestward of Torre Cavallo, and near its mouth are the ruins of a castle. Cannitello village, on the beach about 1 mile westward of the mouth of Alta Fiumara, has been almost destroyed by an earthquake.

Anchorage can be obtained by large vessels about 400 yards north-westward of the mouth of Alta Fiumara, in 16 fathoms, sheltered from winds between east, through south, and southwest, but it is impossible to stay here during strong northerly winds. There is a tide rip about 800 yards westward of the mouth of the river.

Punta Pezzo is flat and sandy to the foot of the low hill about 400 yards within it, on which is Pezzo village. Piale village is on a hill about $\frac{3}{4}$ mile southeastward of the point.

Light.—A light is exhibited, at 46 feet above high water, from a gray trellis framework on the generator, 46 feet high, on Punta Pezzo.

Tide rips.—There are heavy tide-rips in the vicinity of Punta Pezzo.

The coast from Punta Pezzo turns southward $2\frac{1}{4}$ miles, to the mouths of Fiumara di Catona, and is a wide sandy beach, the cultivated slopes of the hills rising gradually inside it.

Scilla (ancient Scylla), the castle of which stands on a rocky bluff 223 feet above the sea, rises in terraces from the sandy bays on both sides of the bluff; it contains many fine buildings and several fountains, but the streets are narrow and steep.

The population is about 7,500. There are silk manufactories (mulberry trees abounding in the district), and good wines are produced. From July to September swordfish are caught in large numbers. The land along this part of the coast rises to a considerable elevation and is scored by deep ravines, chiefly the channels of mountain torrents, and in many places is thickly wooded.

Pier.—A pier has been constructed on the northeastern side of the bluff; it commences at a distance of 55 yards southeastward from the extremity of the bluff, and extends in a 54° direction for a dis-

tance of about 80 yards, passing over a rock above water in the vicinity.

Light.—A fixed green light is erected on the head of the old mole at Scilla.

The light is exhibited, $27\frac{1}{2}$ feet above high water, from a pole $24\frac{1}{2}$ feet high and is visible 3 miles. (See Light List.)

A group flashing white light, visible 16 miles, is erected on Castle Scilla. The light is elevated 237 feet above the sea from a skeleton iron tower. (See Light List.)

Caution—Danger.—A rock, above water, lies about 800 yards to the eastward of the bluff close to the shore. Outside of it the bottom, which is composed of sand, gravel, and rocky patches, is very uneven, but at $\frac{1}{4}$ mile from the shore is a depth of 100 fathoms. North-northwest 600 yards from the bluff is a heavy tide rip.

Anchorage.—Temporary anchorage may be had in the western bay off the Marina of Scilla in from 12 to 16 fathoms (sand) 300 yards from the shore.

Lifeboat.—A lifeboat is stationed here.

The coast.—From the western Bay of Scilla the clifty coast trends 248° to the point and tower of Cavallo; to the westward of the bay is a small fort; over Cavallo Tower is a semaphore telegraph station.

From Cavallo Point the coast runs nearly in the same direction to the low point of Pezzo; it retains its clifty character as far as the fort on the east bank of the Alta Fiumara, thence the remaining 2 miles is a sandy shore, cultivated within, and bordered by numerous houses, including the village of Cannitello with its church and detached belfry. At Pezzo Point is a battery, and on the heights within is the chapel of Piale, and to the eastward the ruined tower of Pezzo.

There are few rocks off the eastern shore and the mouth of the Fiumara; it is otherwise bold all along.

Pezzo Point.—A group flashing white light, elevated 39 feet above the sea, and visible 11 miles, is exhibited from Pezzo Point.

Telegraph cables.—Four submarine cables are laid across the strait from about $\frac{3}{4}$ mile eastward of Pezzo Point to Canzirri, 2 miles westward of Cape Peloro.

Caution.—Anchorage in the vicinity of the telegraph cables is prohibited.

Tide rip.—A heavy tide rip is $\frac{1}{4}$ mile off the point, and another occurs at $1\frac{1}{2}$ miles to the eastward.

Coast.—From Pezzo Point the coast turns abruptly to the southward for $2\frac{1}{2}$ miles to Fiumara di Catona, and is formed by a sandy beach with well cultivated and thickly populated land behind; a bank extend for a distance of about 100 yards off the mouth of the Fiumara.

The coast from the mouths of Fiumara di Catona trends southward $3\frac{1}{2}$ miles to Porto Nuovo di Reggio; it is high, well cultivated, and several streams flow through it into the strait. Catona village, near the mouth of Fiumara di Catona, and Gallico village, near the mouth of Fiumara Gallico, about 1 mile to the southward extend along the beach, but the water off them is too deep to afford safe anchorage.

Rada di Pentimele is a small bay lying between the mouth of Torrente Torbido, which forms a little point about $1\frac{1}{2}$ miles southward of Fiumara Gallico, and the mole of Porto Nuovo. There is anchorage 400 yards off the beach in 27 fathoms, good holding ground; it is one of the most secure anchorages in the strait, as the streams are weak, and southwesterly winds do not generally blow there with much force.

Villa San Giovanni extends between Punta Pezzo and Acciarello village, about 1 mile to the southward; it is an industrial center with many chimneys belonging to silk-weaving factories and steam mills.

The port lies about 1,600 yards southward of Punta Pezzo; it is within a mole with an elbow, which shelters a small area of water from southerly winds. There are wharves along the beach in the port, but the depth alongside them is very small; there are depths of about $3\frac{1}{2}$ fathoms alongside the outer part of the mole. A little mole extends from the wharves in the north part of the port, and has a depth of 1 fathom at its head.

Fortified port.—Villa San Giovanni is a fortified port. (See Regulations.)

Prohibited anchorage.—Anchorage is prohibited off the coast from 300 yards southward of Porto di Villa San Giovanni to the mouths of Fiumara di Catona.

Communication.—There is railroad communication with Naples and Reggio, and a service of steam ferryboats with Messina.

Light.—An occulting green light, elevated 26 feet and visible 5 miles, is exhibited from an iron structure, 23 feet in height, situated on the outer end of Villa San Giovanni Mole. (See Light List.)

Reggio (ancient Rhegium Julii), on the shore of the strait about $\frac{1}{2}$ mile southward of the port, has a population about 44,570. It was much damaged by the severe earthquake of December 28, 1908; part of its walls can be seen from a considerable distance. Northward of Reggio is a sandy bay nearly $3\frac{1}{2}$ miles long; it is rendered remarkable by the frequent appearance of the optical phenomenon named Fata Morgana.

Depths.—There is a depth of $2\frac{1}{2}$ fathoms in the entrance to the port and from $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms inside.

Industries.—One of the chief industries is the extraction of essential oils from oranges, lemons, and bergamot; rearing silkworms, weaving silk, and producing oil, wine, and fruit.

In the district are several mines containing iron, copper, and silver, but these are unworked.

Trade.—The principal articles of export are oils, wine, and silk; and of import, coal, cereals, etc.

Coal.—About 9,000 tons are kept in stock by the gas company and railway for their own use, but no large quantities of coal, patent fuel, or oil fuel are available for vessels. Coaling is performed in lighters; from 200 to 300 tons can be loaded in 24 hours.

Supplies.—Fresh provisions are plentiful; good water can be obtained from the public fountain and there are some water boats.

Communication.—Reggio is the center of a railroad system to all parts; steamers run twice a day to Messina. There is a regular service of ferryboats carrying trains and passengers between Reggio and Messina; vessels navigating the strait should endeavor to avoid them as much as possible so as not to interfere with their route.

Port Reggio lies within a mole which extends about 200 yards northward from a small point. The entrance, eastward of the head of the mole, is about 100 yards wide with depths of from $2\frac{1}{2}$ to 5 fathoms, and the depths in the port are from $3\frac{1}{4}$ to $4\frac{1}{4}$ fathoms. The southwestern side of the port is bordered by quays, on which there is a railroad. The port is well sheltered except from northerly winds.

Fortified port.—Reggio is a fortified port. (See Regulations.)

There are nine forts between Reggio and Scilla, and it is said others are to be built toward the lighthouse at Cape dell' Armi.

Lights.—A flashing green light, elevated 36 feet above the sea and visible 5 miles, is exhibited from an iron structure, 32 feet high, situated on the outer end of the western mole at Reggio.

When the harbor is crowded a fixed green light is shown 13 feet below the flashing green light.

A flashing red light, elevated 26 feet and visible 5 miles, is shown from an iron structure on masonry base, 23 feet in height, on the eastern side of entrance to the port. (See Light List.)

Directions.—Vessels entering the port should keep on the side of the channel nearest the mole head, and leave a white buoy, quadrangular shaped and surmounted by a staff and disk, moored 79 feet to the southward of the light on the shore, on the port hand.

When the port is closed, a red flag will be shown from a mast at the head of the mole by day and a red light at night.

Buoys.—At the entrance to the port of Reggio are two buoys; one, a white cylindrical iron mooring buoy, lies about 268 yards 350° from the light on the molehead, and the other, a red iron cylindrical mooring buoy, is moored about 361 yards 19° from the same light.

Giunchi Anchorage—Buoys.—In the roads to the southward of the port. There are one square wooden and two cylindrical iron

mooring buoys 300 yards apart in the northeast and southwest direction; they are only available for small vessels.

Anchorage.—Vessels anchor in the bay northward of Reggio, but the edge of the bank is so steep and the water so deep, even at a short distance out, that the anchorage is hardly available for strangers.

Winds, etc.—At Reggio north and northeast winds prevail during 215 days of the year; east and southeast winds 42 days; south and southwest winds 88 days. The average annual rainfall is 22.66 inches; most of the rain falls from October to February. The mean annual temperature is 64.2°, and the mean height of the barometer is 29.99 inches. The barometer is highest in January, 30.06 inches, and lowest in April, 29.90 inches.

The coast.—From Reggio the coast continues low and sandy for 9½ miles to Cape dell' Armi. At 5 miles from Reggio is Cape Pellaro, a low point, northward of which is a sandy bay, where anchorage may be had in case of necessity; the same may be said of this anchorage as of that off Reggio. A few rocks lie close off Cape dell' Armi; they are conspicuous by their whiteness. There is deep water close to the shore.

Semaphore.—On Cape dell' Armi, close to the lighthouse, is a semaphore station 402 feet above high water. The signal house with tower is painted in black and white checkers. Vessels can communicate by the International Code of Signals.

Lloyd's signals.—There is a Lloyd's signal station on Cape dell' Armi.

Light.—On Cape dell' Armi is a white octagonal tower above dwelling, from which, at an elevation of 312 feet above the sea, an occulting white light is exhibited, which is visible 20 miles. (See Light List.)

The coast from Reggio trends southward 9 miles to Cape dell' Armi, and is low and sandy. Punta Calamizza, southwestward of Reggio town, has some sunken rocks near it. Fiumara di Sant' Agata flows into the strait 1½ miles farther southward, and at its mouth is a wide bed of white gravel; it is crossed near the mouth by a long iron bridge on low pillars, and farther up by a masonry bridge with large arches.

Baia di Pellaro extends about 3½ miles southward from the mouth of Fiumara di Sant' Agata to Punta Pellaro; the water in it is deep.

Punta Pellaro is wide and sandy, and a sandbank of recent formation extends off it; at 30 yards from the point there are 1½ fathoms water. Lazzaro village, on the beach, 3½ miles southward of the point, and Fiumara di Lazzaro, on its southwestern side, with a gray bed and a red iron bridge over it, are noticeable.

From Cape dell' Armi the general trend of the south coast of Italy is eastward 18 miles to Cape Spartivento. The shores continue well

cultivated, and between the many spurs falling from the mountain range of Aspromonte are several streams, the deep ravines or water-courses being in many places clothed with fine timber.

Melito, containing a population of about 5,724, is the most southern town of Italy. It is situated on rising ground a short distance from the beach on the right bank of the Fiumara di Melito. Above it is a semaphore telegraph station and below the straggling village of Porto Salvo.

Pentedattilo.—About $2\frac{1}{2}$ miles northward of Melito, at an elevation of 1,515 feet, is the small village of Pentedattilo. It is inclosed within the dilapidated walls of an ancient castle perched on a crag, accessible by steps cut in the rock. It is said to have derived its ancient name of Pentedactylus from the peculiar resemblance of the peaks above it to the human hand. The Greek language is still much used in this and the neighboring mountain villages.

The shores along this coast are clear of danger, there being nearly 50 fathoms at 200 yards off.

Two miles eastward of Melito is the tower of Trinita or Salto and along the shore between are a few cottages.

Theodosia Point, 5 miles eastward of Salto, has a tower on it, off which is a cluster of rocks, with shoal water a little outside of them.

Marina di Bova.—Between Salto Tower and Theodosia Point, and near the mouth of Daria Stream, is Marina di Bova, the town being situated 4 or 5 miles inland and considerably elevated. The latter place was one of the towns which suffered so severely from the earthquake of 1783.

Several rocks, both above and under water, lie along the shore to the next point 3 miles distant, on which is the tower of Monza; midway is another tower.

Cape Spartivento (ancient Herculeum Promontory) is the southern point of Italy and terminates in a white vertical rocky cliff. Rocks and shoal water extend a short distance off, but at $\frac{1}{2}$ mile there are 12 fathoms.

Light.—From a white square tower, 51 feet high, against a white two-storied house on the summit of Cape Spartivento, at an elevation of 210 feet above the sea, a flashing white light is exhibited, visible 21 miles. (See Light List.)

Semaphore.—On Cape Spartivento, near the lighthouse, is a semaphore station 151 feet above high water. The house with tower is painted in black and white checkers. Passing vessels can communicate by the International Code of Signals.

NOTE.—For the description of the coast northeastward of Cape Spartivento see H. O. No. 153, Mediterranean Pilot, Vol. III.

The coast from Capo dell' Armi (latitude $37^{\circ} 57'$ north, longitude $15^{\circ} 41'$ east) trends east-southeastward 5 miles to Melito town; it is

high and bordered by a beach which commences about a mile from the cape; there are depths of nearly 50 fathoms 200 yards off the coast; some streams flow through the valleys between the spurs of the mountainous range of Aspromonte and into the sea; their mouths are generally crossed by ironwork bridges on masonry pillars.

Melito di Porto Salvo is on the right bank of Fiumara di Melito and on rising ground a short distance inside the beach; it has a population of about 5,340. On the beach to the southwestward of the town and near a church with a cupola and campanile, is Porto Salvo village, a small group of houses.

About $2\frac{1}{2}$ miles northward of Melito, at 1,515 feet above high water is the small village Pentadattilo; it is on a crag, and is said to have derived its ancient name of Pentadactylus from the peculiar resemblance of the crag to a man's fist.

The coast from Melito trends eastward $13\frac{1}{2}$ miles to Cape Spartivento; Torre del Salto or Trinita, on the coast $1\frac{1}{2}$ miles eastward of the mouth of Fiumara di Melito, is not conspicuous.

Fiumara di Acrifa flows into the sea about $\frac{3}{4}$ mile eastward of Torre del Salto, and 2 miles farther eastward is Fiumara Amendolea, with a wide bed which is almost always dry in summer.

Anchorage can be obtained off Marina di Bova, by large vessels in 16 fathoms water, a little more than 800 yards from the coast; smaller vessels anchor in about $3\frac{1}{2}$ fathoms 400 yards off the coast, and southward of the bridge over Torrente Salerno. These anchorages are considered the most secure on the coast, with northerly winds.

The coast eastward to Torre Mozza, distant $3\frac{1}{2}$ miles, is bordered by rocks, above and below water. There is a large light-colored spot on the coast eastward of the Marina.

Torre Mozza (latitude $37^{\circ} 55'$ north, longitude $16^{\circ} 0'$ east), on a little promontory, is dark and quadrangular. A rocky bank, with a least depth of $1\frac{1}{2}$ feet, extends about 400 yards southward from the promontory, and caution is necessary by coasting vessels, when keeping close to the coast in fresh northerly winds, to clear it.

Anchorage can be obtained off the railroad station of Palazzi, about $\frac{1}{2}$ mile westward of Torre Mozza, and also off the coast between Torre Mozza and the sandy Punta di Spropoli, 2 miles to the eastward, where there is a depth of 9 fathoms about $\frac{1}{2}$ mile, and $5\frac{1}{2}$ fathoms about 600 yards, from the coast.

There are two rocks, each about 30 feet in extent, about 400 yards off the beach between Punta di Spropoli and Cape Spartivento; the rocks are 30 feet apart, and there is a depth of 4 feet on the western and 7 feet on the eastern one. The coast here should not be closed to less than $\frac{1}{4}$ mile.

CHAPTER V.

CORSICA ISLAND AND THE TUSCAN ARCHIPELAGO.

East coast.—**Cape Corse or Corso** ancient *Sacrum Promontory*), a promontory 20 miles in length and 8 miles in extreme breadth, projects northward from the elevated land in the interior of Corsica, Mount Stello, about 13 miles from its extremity, being 5,193 feet above the sea. It terminates in a headland of moderate height and 4 miles in extent between Cape Bianco on the west and Agnello Point on the east, the whole bearing the name of Cape Corso. On the cape is a semaphore, several villages, and houses.

Cape Bianco, the northwestern extremity of Corsica, derives its name from the white appearance of its western part, which assumes a triangular form; it is high, somewhat round, and within it are the lofty mountains of the interior. From Cape Bianco the coast is clear and bold for 1.7 miles eastward to the tower of Tolari, near the mouth of a rivulet, on both sides of which are small villages fronted by sandy bays, that near the tower having a rock off the entrance.

Semaphore.—A semaphore is situated on Corno di Becco, 416 feet above the sea. This is a Lloyd's signal station.

Pointe Tolare (Tollare) is the termination of the eastern spur of the range running northward through *Presqu'île du Cap Corse*; eastward of Pointe Holare is a point, on which is a tower surmounted by a pyramid. The point with the tower separates two small coves in each of which is a sandy beach, and some houses on the shore; these houses are the warehouses of the parish of Ersu, and are uninhabited. There is anchorage northward of the tower, in about 8 fathoms water, sheltered from southeasterly winds; the sea is heavy with southwesterly winds.

Agnello Point.—At 2 miles eastward of Tolari is the tower of Agnello upon a low point. In the middle of the intermediate coast is a bay with a clear sandy beach, having at its western extremity the village of Barcaggio near the *Agua River*, and on the Barcaggio Point, westward of the village, a battery. Close off the battery are two small islets and some sunken rocks. Costa Point is the eastern extremity of the bay, and the rounded head at the foot of Mount Campana, which is elevated 576 feet, is bold. A small bight, called *Cala Cimentera*, in which is a stream, is formed between it and Agnello Tower.

Water.—A stream running down the western slope of the mount enters the bay on the eastern side, forming a good watering place.

Costa Rock, 300 yards 318° from Costa Point, is a rocky patch of 2 fathoms; elsewhere without the 5-fathom curve of soundings, which on the southern side extends from 800 to 300 yards offshore, there are from 6 to 14 fathoms.

Corso Road.—With southerly winds, there is anchorage off the beach of Barcaggio in front of the houses, in from 6 to 8 fathoms water, or farther eastward off the cliffs at the base of Mount Campani in from 12 to 14 fathoms.

Life-saving stations.—There are life-saving apparatus at Giraglia Lighthouse and Barcaggio.

Lloyd's signals.—There is a Lloyd's signal station at Cape Corse.

Giraglia Island is about 700 yards in length, 200 yards wide, and lies nearly $\frac{3}{4}$ mile from the eastern part of Cape Corso. It is skirted with rocks, one of which, about 200 yards off the north-western end of the island, is awash. On its northern end, where it is about 200 feet high, is a light tower and battery, the land declining toward the southern end.

About 400 yards southward of Giraglia Island is a rocky patch with 4 fathoms water on it.

Light.—From a cylindrical tower situated on the northern end of Giraglia Island, is exhibited at 269 feet above the sea a flashing white light, visible 23 miles. (See Light List.)

Ste. Marie Shoals and Anchorage.—About $1\frac{1}{2}$ miles $142^{\circ} 30'$ from Agnello Point is a tower on a low point named Ste. Marie, and on its southern side is a small cove used by fishing boats. The intermediate coast is cliffy with two small sandy beaches near the latter point. About 750 yards 19° from Ste. Marie Tower is a rocky shoal with 3 fathoms water, and from 4 to 6 fathoms close-to; between the shoal and shore there are 7 fathoms.

At rather more than 1 mile 61° from the above tower is the center of another rocky shoal about 600 yards in extent, 90° and 270° , with 5 fathoms water on it, and from 10 to 12 fathoms around it, shoaling gradually to the shore.

Between the two shoals there is anchorage with offshore winds in 9 or 10 fathoms, weeds, with the tower on Agnello Point bearing about 299° , the tower of Ste. Marie 227° , distant a long $\frac{1}{2}$ mile, and the tower on Finocchiarola Islet 159° .

Finocchiarola Islet.—A little more than $\frac{1}{2}$ mile southeastward of the tower of Ste. Marie are three small islets extending nearly 800 yards from the shore; the outer of these is named Finocchiarola and has a tower on it. The passages between the islets, and between the islets and coast, are shallow and choked with rocks.

Small vessels find shelter southward of the islets from westerly winds and round northward as far as northeast, in 5 or $5\frac{1}{2}$ fathoms water.

Macinaggio.—This little port, $1\frac{1}{4}$ miles southward of Finocchiarola Islet, is formed by two moles which project from the shore about 100 yards at the southern end of Macinaggio Bay. Within the moles there are from 3 to 8 feet water, and 300 yards from the beach northward of the North Mole 10 to 15 feet; on the north point of the bay 900 yards from the South Mole is a battery. There is anchorage in the road of Macinaggio with westerly winds, in from 8 to 10 fathoms water, with the battery on the north point of the bay bearing about 306° and the lighthouse on the South Mole 249° .

Buoys.—Moorings for torpedo boats, with three iron buoys, have been laid down in this port.

Light.—From an iron standard on the South Molehead of Macinaggio Harbor is exhibited, at an elevation of 25 feet above high water, a fixed red light which should be visible 5 miles. (See Light List.)

Supplies.—Some provisions could be obtained in the village, and water from a fountain on the quay.

Telegraph cable—Beacons.—The landing place of the submarine cable from Leghorn, situated close northward of the port, is marked by two beacons, painted blue and white in horizontal bands, with white circular topmarks, which in range bear 230° . Anchorage is prohibited near the alignment of the beacons.

Life-saving stations.—There are life-saving apparatus at Macinaggio, Luri, and Orbatimga.

Cape Sagro.—About $11\frac{1}{2}$ miles 172° from Ste. Marie Tower is Cape Sagro, a slightly projecting cliffy point with a tower on it, terminating from Mount Stello (5,193 feet high). The intermediate coast is generally high, bold, and cliffy, broken by three small bays with beaches; the northernmost bay is named Meria; the next Porticciolo; and the southern, Pietro Corbara. The first will be recognized by a tower on its north side $1\frac{1}{2}$ miles from Macinaggio; the second $3\frac{1}{2}$ miles farther on, by a village on its southern point, with the small town of Luri $\frac{2}{3}$ mile northward of it; and the third which is $2\frac{1}{2}$ miles northward of Cape Sagro, will be known by the town of the same name on the shore of the bay. The Marina de Sisco is a village on the shore northward of the rivulet between the cape and Pietro Corbara.

The whole of these villages derive their names from larger towns in the interior of the country, of which they are the Marinas or commercial ports. The bays are, however, only fit for coasting and fishing vessels during offshore winds. All along this coast at the

distance of about 700 yards there are generally from $6\frac{1}{2}$ to 15 fathoms water, and $\frac{1}{2}$ mile from the cape 18 to 30 fathoms.

Semaphore.—There is a signal station 448 feet above the sea, on a little hill, about 1 mile northward of Cape Sagro, at which the International Code is used.

Bastia.—Six miles 194° from Cape Sagro is the fortified seaport of Bastia, the principal commercial town and, previous to the union of Corsica with France, the capital of the island; it rises somewhat like an amphitheater, and though it has a fine appearance from seaward, the old town is ill built, with narrow crooked streets. It is divided into two parts, Terra Nuova and Terra Vecchia (new town and old town); the latter, surrounded by walls and ramparts, and defended by a citadel, stands above the rocky cliffs south of the port, and is further protected by Forts de la Croix and Straforello, on the heights above the town and port. Bastia is the seat of a royal court for the island, and of tribunals of commerce and of primary jurisdiction; and has a communal college, a model school, a society of public instruction, theater, public gardens, gas works, hospital for seamen, etc. Population in 1911 was 27,378.

On the southern side of Vieux port is a rocky promontory, occupied by the citadel, in the middle of which is Sainte Marie church, which has a white campanile. In the town, Saint Jean church, with two steeples, is conspicuous; a little above and inside it is the theater, a large square building, with the military hospital on a hill to the northward. Westward of Port Saint Nicolas is the valley of Rivière Fango, with Cardo village, having a square steeple and two factory chimneys at its head. Sainte Lucie church, with a large white campanile, is on a height northward of the valley. Northward of the town is the gasworks, Toga furnaces, and, near the coast, the ruins of Tour Toga.

Bastia Approach.—Fairway reserved for traffic when submarine vessels are exercising.—When the flag, upper half red and lower half yellow is hoisted at the signal stations or on the vessel escorting submarine vessels, to indicate that the latter are exercising submerged, all vessels wishing to enter or leave the port of Bastia must use the fairway, defined below, in which submarine vessels are prohibited from exercising submerged.

This fairway is limited as follows:

On the south, by the alignment 282° from Mount Pigno and Sainte Marie church.

On the west by the coast.

On the northeast by the arc of a circle drawn with Sainte Marie church as center, with a radius of 2 miles, from the first-named limit to the coast northward of the port.

Vieux port is partly formed by a cove on the northern side of the promontory on which is the citadel; it is within *Jetée du Dragon*, which extends in a curve about 150 yards northward from the eastern extreme of the promontory, and *Môle Génois*, which extends about 150 yards in a curve southeastward from the north point of the cove, leaving an entrance, about 90 yards wide, between them.

There are depths of $5\frac{1}{2}$ and $6\frac{1}{2}$ fathoms in the entrance, but the 3-fathom curve is a little more than 100 yards inside, whence the water shoals northwestward to the head of the port.

The port is sheltered from southeasterly winds, but easterly and northeasterly winds send in a sea which renders the outer part of the port untenable.

There are two quays in the inner part of the port for loading or discharging cargo; *Quai de la Santé*, on the northern side, extends eastward to and along the inner part of *Môle Génois*; vessels of 14 feet draft can go alongside the inner part of the mole, but all vessels are generally moored with sterns to the quay, and use lighters for dealing with the cargo. *Quai du Sud* is not so well sheltered, and the depth alongside is less, with rocky bottom in places; on the coast between *Quai du Sud* and *Jetée du Dragon* is a narrow space furnished with bollards, which are also placed on the inner part of the jetty.

The Naval office is on *Quai de la Santé*.

There is a warping buoy in the outer part of the port.

Shoal.—A small shoal patch, with $2\frac{1}{2}$ fathoms water, lies 100 yards eastward of the shore at the inner end of *Môle Génois*.

Caution.—The *libeccio*, which descends from *Mont Pigno* in violent squalls, is much feared at *Bastia*, especially by vessels in *Vieux port*; it is then necessary to double the moorings if at anchor; on entering with a *libeccio* a vessel should lie head to wind instead of, as usual, head to seaward.

Port Saint Nicolas, on the northern side of the town, is within *Jetée Saint Nicolas*, which extends 150 yards eastward from *Pointe des Jesuites*, then 200 yards southeastward, and then 600 yards southward, parallel with the shore; an extension of the southern end of the last portion is nearly finished (1915). A jetty extends about 150 yards eastward into the port from the shore about 400 yards southward of *Pointe des Jesuites*, and a jetty extends about 80 yards from the shore under *Batterie Saint Erasme*, about 300 yards farther southward.

There are depths of from $5\frac{1}{2}$ to 9 fathoms in the port for about 100 yards westward of the southern portions of *Jetée Saint Nicolas*, and thence the water shoals gradually to the shore.

The two inner portions of *Jetée Saint Nicolas* are lined with quays, and vessels go alongside them, sheltered from northeasterly winds

and spray by a wall; there is a depth of from 20 to 26 feet alongside the inner portion and of 26 to 49 feet alongside the second portion. The southern portion of the jetty has depths of from 8 to 9 fathoms close to, but rocks prevent approach to it nearer than about 20 yards. There is a quay along the shore in the northern part of the port; it is reserved for mail steamers, and has depths of from 11 to 17 feet alongside; there are landing steps here for boats.

The port is accessible in any weather, and the inner part is well sheltered from all winds. The railroad runs on to the quays and also the jetty extending eastward into the port.

Buoys.—A red buoy is moored about 60 yards eastward of the lighthouse on the southern end of *Jetée Saint Nicolas*, and marks the extension works; the passage between the buoy and the jetty must not be used. The extension works are covered by the red sectors of *Jetée du Dragon* and *Batterie Saint Erasme* lights.

Three mooring buoys are placed in the port parallel to the shore, and are for the use of vessels when the *libeccio* is blowing with squalls.

Pilots.—The pilotage station of Bastia extends from the anchorage in *Anse de Porto Vecchio* northward to the anchorage off *Toga* furnaces.

Vessels pay on entering and on leaving the port.

There are special rates for naval vessels.

When the weather will not permit a pilot to go out to a vessel about to enter he will remain in the entrance and direct the vessel by signals and by voice.

Directions.—To enter *Vieux port*, steer in with *Saint Jean* church steeples bearing about 270° , and when *Sainte Marie* church is open northwestward of *Jetée du Dragon* lighthouse, steer through the entrance and round *Môle Génois* closely.

At night, steer westward to pass about 100 yards northward of *Jetée du Dragon* light, keeping in the green sector of *Batterie Saint Erasme* light to clear the works at the south end of *Jetée Saint Nicolas*. Pass through the entrance, and round *Môle Génois* light closely.

It is dangerous to leave the port when strong southeasterly winds are blowing, on account of the heavy sea outside the moles.

For *Port Saint Nicolas*, approach with *Saint Jean* church steeples bearing about 270° ; when the white iron light-column at the end of *Jetée Saint Nicolas* bears about 315° turn gradually northward and keep about 50 yards within the mole. As the squalls during the *libeccio* are very violent, and the bottom is shelving rock, vessels should anchor near one of the mooring buoys in the port, and secure to one of them.

Outer anchorage.—There is temporary anchorage outside a line joining the heads of *Jetée du Dragon* and *Jetée Saint Nicolas*, with *Saint Jean* church steeples bearing about 265° , in from 18 to 22 fathoms, weeds.

Trade.—The principal articles of import to the port of Bastia consist of coal, casks, flour, iron and steel, petroleum, woolen and cotton goods, coffee, building materials, glass and earthenware, wines, spirits, and rice; and exports, citrons in brine, chestnuts, copper, mineral water, cork, charcoal, timber, wine, and tanning extract. The coasting trade between Bastia and France is allowed in French vessels only. There are two large tanning factories.

Lights.—The entrance to the old port is marked at night by a fixed green light 41 feet above the sea, exhibited from a white masonry turret 23 feet high, on the mole head on the northern side, visible 5 miles, and a group-occulating white light with red sector 54 feet above the sea, is exhibited from a white masonry turret 36 feet high, on the head of the *Dragon Jetty* on the southern side, visible 12 miles.

St. Erasmé Light.—From a lantern on masonry base, 14 feet high, situated on the western side of the road between *St. Erasmé Battery* and the sea, at 267 yards 274° from *St. Nicholas Mole Light*, is exhibited, at an elevation of 33 feet, a fixed light with one red and one green sector. The red light is visible over the end of *St. Nicholas Mole* from a distance of 4 miles, and the green light southward from 3 miles. (For sectors see *Light List* and chart.)

St. Nicholas Mole Light.—A fixed red light, elevated 37 feet above the sea and visible 5 miles, is exhibited from a white iron column, 20 feet high, situated about 30 feet within the new outer extremity of the mole.

Signal station.—There is a signal station at *Port St. Nicholas Mole Lighthouse*, which is open from January to March. (See *Light List*.)

Lifeboat.—There is a lifeboat and life-saving apparatus at Bastia.

Porto Vecchio is merely a small bay with a beach and an inlet close to it on the southwestern side of the citadel. Small coasting vessels and fishing boats find shelter here in 5 or 6 fathoms water during northwest winds, but several sunken rocks exist. A little farther to the southwest, and near the last houses of the town, is a fountain used by shipping; there is also a rivulet of good water just northward of the town.

Supplies.—Provisions are plentiful and cheap. Water, from the town waterworks can be obtained by screwing on a canvas hose to a standpipe on *Quai de la Sante*; it is at a high pressure, and is said to be fairly good for drinking, but to be sometimes turbid.

Repairs.—Urgent small repairs can be executed, work in metal being done at the forges of Toga factory, and work in wood at Anolletti workshops.

Communication.—A railroad runs to Casamozza, and continues southward to Ghisonaccia; a line runs from Casamozza to Ponte Leccia, whence a line runs westward to Île Rousse and Calvi, and another southward to Ajaccio. There is telegraphic communication, the office being open until midnight.

Life-saving station.—There is a lifeboat in the port, and a life-saving gun and a rocket apparatus at the customhouse.

Pointe de Toga, 650 yards northward of the root of Jetée de Saint Nicolas, is marked by Tour de Toga in ruins, and close southward of it are the Toga furnaces.

Coal.—Bastia is not a coaling port; about 3,000 tons are imported annually for local requirements, but there is seldom more than 500 tons in stock.

Consul.—The United States is represented by a consular agent.

Arco Point Anchorage.—From Bastia Road a low sandy shore curving slightly to the westward extends 9 miles in a 158° direction to Arco Point. Arco Point is a little higher than the coast between it and Bastia, but is only known by a tower on it. There is shelter off this part of the coast from westerly winds; the best berth is to the north-northeastward of the tower, $1\frac{1}{2}$ miles from the shore, in from 13 fathoms, sand and weeds.

Biguglia Lagoon.—A long lagoon, named Biguglia, occupies a large extent of this coast, and is separated from the sea by a narrow strip of low sand dunes, covered with a thick vegetation; the small entrance to it is about 2 miles from Bastia. At $2\frac{1}{2}$ miles southward of Arco Tower is the mouth of the Golo River, which communicates with the lagoon by a canal. In the interior of the country are several villages and houses.

The coast.—From Arco Point the sandy beach continues southward to the ruins of Florentina Tower, distant 17 miles; several small streams run into the sea, and on the beach are the small villages of Pellegrino, Padulella, and Prunete. The Alto River, which is next in size to Golo River, is 1 mile southward of Pellegrino. About 2 miles beyond Florentina Tower is Alistro Tower; a little to the southward of the entrance to Alistro River and 3 miles farther southward is another, named Bravone, from the river a little to the northward of it. The intermediate coast is low, clear of danger, with a depth of 17 or 18 fathoms water at 1 mile from it.

Life-saving stations.—There are life-saving apparatus at Pellegrino and Prunete.

Alistro Light.—A group flashing white light, elevated 308 feet above the sea and visible 24 miles, is exhibited from a gray octagonal

tower, with basement, 82 feet high, situated on heights at about $\frac{1}{2}$ mile 316° from Alistro Tower. This light, and the light shown from Africa Rock, from which it bears 257° 24 miles, mark the channel between Corsica and the Tuscan Archipelago. (See Light List.)

Semaphore.—The semaphore signal station is close to the light-house, and can be communicated with by the International Code. The semaphore is open all the year.

Tavignano River.—At 3 miles southward of Bravone Tower is that of Diana, and 2.3 miles beyond it is Tavignano River with a tower on the southern side. Within Diana Tower is the lagoon of the same name, 12 to 34 feet deep, which extends about 2 miles 215° . A little northward of this lagoon is another named Terenzana, but of less extent. A rock awash lies $1\frac{1}{2}$ miles southward of Bravone Tower and about 400 yards from the shore; and near the shore between this rock and the tower there are shallow patches. The fort of Aleria stands about $1\frac{1}{2}$ miles inland on a height southward of Tavignano River.

Sand banks extend a considerable distance from the mouth of the river; a depth of 13 feet has been reported at a distance of 1,200 yards. The banks are of a shifting nature, and should be given a good berth.

Life-saving station.—There is a life-saving apparatus at Aleria.

Coast.—From Tavignano Tower the sandy shore changes its direction to the southwestward and at 7.3 miles beyond it is Vignale Tower; 1 mile farther southward is the mouth of the Orbo River, 1 mile 67° of which, and off the tower, are some rocks and shallow water, extending $\frac{1}{2}$ mile from the shore. The coast is low and marshy, with from 9 to 11 fathoms water at 1 mile from it, shoaling gradually to the beach. There are three lagoons close to the coast, the largest of which is named Urbino, 10 to 30 feet deep; its entrance, about 4.6 miles southwestward of Tavignano Tower, is called Foce de Fioraventi.

A road traverses the whole island from the mouth of the Orbo River to that of Taravo River on the west coast. It ascends to Ghisoni through the gorges of Inzecca, and Kyrie Eleison, through the forests of Marmano and Verde, runs southward to Zicavo, follows the valley of the Taravo and reaches the sea at Porto Pollo.

Railroad.—On the left bank of the Orbo, at about $\frac{1}{2}$ mile distant from the village of Ghisonaccia is the terminus of a line of railroad from Bastia.

Solenzara Tower stands on the southern side of the entrance to a small river of the same name, which terminates the extensive line of beach extending southward from near Bastia for upward of 52 miles. The shore between Solenzara and Orbo River is low and marshy. Between Vignale and Solenzara Towers (a distance of 9

miles) the shore forms a bay where there is anchorage with offshore winds, in 10 to 12 fathoms water, at 1 mile from the beach; care, however, should be taken not to be surprised by an easterly wind.

A mooring buoy lies off the entrance to the Solenzara River.

Life-saving station.—There are life-saving apparatus at Solenzara.

Port Favone.—From Solenzara Tower the coast, which is of moderate height, becomes rocky, and trends southward, forming several indentations as far as Guardia Point, a distance of 5 miles; it is skirted by rocks, which are, however, close inshore. Three of the above-mentioned indentations, Manichino, D'oro, and Canelle Coves, are useful for fishing boats. Another cove, larger than the others, named Port Favone, is formed on the northern side of Guardia Point; at its head is a beach 800 yards in length, and a river flows into it. Coasting and fishing vessels anchor in the cove with offshore winds and large vessels outside in from 12 to 15 fathoms, weed. In the northwestern corner of the cove is a rock with only 8 feet water on it.

Fautéa Point.—From Guardia Point the coast is irregular and continues southward for upward of 3 miles to Fautéa Point, which is low and projecting with a tower on it. An islet lies close to the point, and between it and Guardia Point is Tarco Cove, of no importance, with a river flowing into it. The coast, which is bold and skirted a short distance by rocks, has from 30 to 45 fathoms water at $\frac{1}{2}$ mile off it.

Pinarello Bay.—A long mile southward of Fautéa Point is Presca Giocana Point, and between is the beach of Lavo, behind which is the lagoon of the same name, into which flows the Sta. Lucia River. Pinarello Bay, between the island of the same name and Presca Giocana Point, is about 1 mile wide and the same deep, terminating at its head in a sandy marshy shore, where are several lagoons. On the northern side of the bay rocks above water extend 600 yards from the shore, but the southern side is clear of danger, with a depth of from 6 to 10 fathoms, sand and weed.

Pinarello Island, on the southern side of the entrance to the bay, is about 700 yards in extent, rugged, and of moderate elevation, with a tower on it; it is separated from the coast by a small boat passage less than 40 yards wide.

Roscana Islet.—1,200 yards 181° from Presca Giocana Point, and nearly in mid-entrance to the bay, is a small islet named Roscana, with several rocks round it. A rock awash lies nearly 80 yards west of it, and another, with $3\frac{1}{2}$ fathoms water on it, about the same distance to the eastward. The passage between the islet and the coast on the northward is less than $\frac{1}{2}$ mile wide; and that between the

islet and Pinarello Island on the southward, 1,200 yards wide, with 7 to 12 fathoms water.

Capicciola Point, about $1\frac{1}{2}$ miles southward of Pinarello Island, is low and projecting to the southeastward, with an islet close to it. The point should be given a good berth. Another point midway separates two coves, the northern of which is named Calangue de las Cola; at its head is a sandy beach, within which is a lagoon.

St. Cyprien Point.—At 2 miles 215° from Capicciola Point is St. Cyprien Point, at the foot of a hill with a tower on it; it is bordered by rocks and shoal water, which extend nearly 400 yards to the southward. The point forms the southern extremity of St. Cyprien Bay and the northern point of the entrance to the Gulf of Porto Vecchio.

Light.—From a white square tower, 41 feet high, with a gray granite house adjoining, situated on St. Cyprien Point, at an elevation of 80 feet above high water, a fixed light with red sector is exhibited. The white light is visible 10 miles, and the red light 6 miles. The red sector is visible over Pecorella Rock and over Benedetto Bank. (For limits of sector see Light List and chart.)

The lighthouse has the appearance of a chapel.

St. Cyprien Bay.—From Capicciola Point the coast is bold and sinuous as far as Araso Point, distant $\frac{3}{4}$ mile; between Araso and St. Cyprien Points the coast forms a bay with a beach named St. Cyprien. It is semicircular, two-thirds of a mile wide and about the same deep, with cliffs on its southern side, terminating in St. Cyprien Point. The small islets of Cornuta lie about $\frac{1}{4}$ mile southward of Araso Point, and just within it is the Island of St. Cyprien, on the western side of which there is anchorage for small vessels in 18 or 20 feet water. Steer in southward of the Cornuta Islets. Large vessels anchor during off-shore winds between the islets and St. Cyprien Point in 9 or 10 fathoms, weeds.

Gulf of Porto Vecchio.—Chiappa Point, at the foot of Mount Chierchio, is clifty and bold; it has a lighthouse on it, a short distance southwestward of which is a telegraphic semaphore, 274 feet above the sea. Between St. Cyprien and Chiappa Points is the entrance to the Gulf of Porto Vecchio, which extends 4 miles to the westward and southward forming several indentations. Although the inner part of the gulf is somewhat shallow for vessels of heavy draft, and obstructed by shoals, yet vessels of moderate draft thread their way into the interior, where they are landlocked and sheltered from all winds and sea. From St. Cyprien Point the northern coast of the gulf trends westward 1.3 miles to Benedetto Point. The intervening coast forms a bay with a sandy beach at its head, which is filled up by a bank of weeds.

Benedetto Bank—Buoy.—The above-mentioned bank extends 750 yards off Benedetto Point, at which distance there are only 3 fathoms; between this depth and the point is the Benedetto Bank with 2 feet water on it, marked on the southern side by a small red spindle buoy with conical top mark. The bank is covered by the inner red sector of St. Cyprien Light.

Stagnolo Bay.—The land about Benedetto Point is isolated, being separated from the main, on the north, by Oso River. To the westward of the point is a deep shallow rocky bight with a sandy beach around it, named Stagnolo Bay.

A patch of sand and mud, having 11 feet over it, lies 1,160 yards 267° from the summit of Benedetto Point, and a rock with 1 fathom over it lies 1,600 yards 256° from the summit.

The coast.—From Stagnolo Bay an irregular coast, composed of cliffs and sandy beaches, trends to the southwestward as far as the low sandy point of Salines, distant nearly 2 miles from Benedetto. Thence the shore turns to the south, east, and northeastward to Arena Point, which is $1\frac{1}{2}$ miles 80° from that of Salines.

Porto Vecchio town is situated on a hill at the head of the gulf westward of the entrance to Rivière Stabiaccio, and is surrounded by walls. Southeastward of the town is a stone quay, 280 yards long, with a small landing jetty. In front of the town are several rocks covered and uncovered, and shoal water extends $\frac{3}{4}$ mile off.

Northward of the quay is a road with several buildings along it; the customhouse is the farthest from the quay. The town is considered unhealthy in summer, when most of the population goes to the uplands of Quenza.

Supplies.—Provisions are abundant from October to June, but are difficult to obtain in summer, owing to the absence of the population. Water can be procured from a fountain on the quay, near the landing jetty.

Life-saving station.—A rocket apparatus is stationed at the customhouse.

A rock with 3 feet over it lies 1,500 yards 329° from the summit of Ziglione Islet.

Beacons.—Tourelle de Cioccia, of black masonry, and surmounted by a cylinder, 11 feet high, stands on the northern side of Écueil de Cioccia, a bank of rocks nearly awash, 600 yards eastward of the town quay. Three red masonry beacons, each surmounted by a cone, mark the northern channel to the quay.

Directions.—From the southward by day pass midway between Le Chiapino and La Pecorella beacons, the channel being 1,300 yards wide, steering for a little northward of Pointe d'Arena, and anchor northward of the promontory on the east side of Anse de Vizza. The wrecks shown on the chart must be avoided.

From the northward by day pass midway between Pointe de Saint Cyprien and La Pecorella beacon, with Mont Cerchio in line with the west end of the beach in Anse d'Arghi, 220° ; keep this mark on until Saint Cyprien lighthouse bears 0° , distant 1,000 yards, when steer westward to the anchorage.

To proceed to the inner anchorage, pass 200 yards southward of Banc de Benedetto Buoy, give Pointe d'Arena a berth of about 400 yards, then pass Pointe Varra, the next point to the southward, at a distance of 150 yards, and steer to the anchorage.

At night, from the southward, approach with Saint Cyprien white light bearing about 310° until through the red sector of Chiappa light; then steer westward to the anchorage, northward of the promontory eastward of Anse de Vizza.

From the northward, approach with Saint Cyprien white light bearing 245° , when through the red sector of Chiappa light steer 209° until Saint Cyprien light bears 337° , when steer westward to the anchorage.

For the inner anchorage, approach Pointe d'Arena (latitude $41^{\circ} 36'$ N., longitude $9^{\circ} 19'$ E.), with Saint Cyprien light bearing 69° , avoiding Banc de Benedetto buoy, and not getting into the red sector of Saint Cyprien light; when past Pointe d'Arena, the white sand of which generally shows clearly, steer to pass nearly 200 yards off Pointe Varra, and then steer to the anchorage, with Pointe d'Arena, if it can be seen, in line with Saint Cyprien light.

Anchages.—Large vessels generally should anchor in the gulf eastward of a line drawn 0° from Anse de Vizza, in from $5\frac{1}{2}$ to 10 fathoms water, sand, and weeds bottom. The anchorage is good, though open eastward, and easterly winds send in a considerable swell, but the sea is said not to become very heavy.

Vessels of less than 17 feet draft can enter the inner basin of the gulf, and anchor in from $3\frac{1}{2}$ to 4 fathoms about 600 yards northward of Îlot Ziglione, with Saint Cyprien lighthouse in line with Pointe d'Arena; here, the bottom is mud and weeds, good holding ground, and the position is completely sheltered, but westerly winds are sometimes very violent and prevent communication with the shore.

Approach to town.—There are two channels suitable for small vessels; the southern one, with 10 feet water, passes northward of Tourelle de Cioccia, and southward of the shoals extending eastward from Îlot Ficaja, which is situated 300 yards northeastward of the quay.

The coast.—From Arena Point the coast is high and cliffy, and trends to the eastward $\frac{3}{4}$ mile to Urca Point, and then curves to the southward and eastward to Chiappa Point. This part of the coast is bold and clear of danger, with $5\frac{1}{2}$ to 6 fathoms water, 200 yards off it.

Pecorella Rock.—Two rocky patches lie at the entrance of the Gulf of Porto Vecchio. Pecorella Rock, the northern group, lies 1,450 yards 113° from St. Cyprien Point Lighthouse, and consists of an islet or rock with shallow patches extending 250 yards to the north-northeastward, and a shoal on which is only a depth of 7 feet lying nearly 200 yards to the eastward.

Pecorella Rock is covered by the red sector of Criappa Point light and by the outer red sector of St. Cyprien light.

Beacon.—The islet has a beacon tower, 28 feet above the sea, painted red and black and surmounted by a ball, on it.

Chiapino Rock lies about 300 yards 40° from Chiappa Point, with from $5\frac{1}{2}$ fathoms water near the rocks, to 6 fathoms midway.

Beacon.—This rock is marked by a beacon tower, painted red and black in horizontal bands, elevated 27 feet above the sea, surmounted by a ball.

Caution is required to avoid these dangers at night.

Between these dangers and Cyprien Point there are from 6 to 14 fathoms water.

Chiappa Point.—An occulting white light with a red sector, over Pecorella Rock, is exhibited, at an elevation of 217 feet above the sea, from a white square tower with basement, 52 feet in height, situated 600 yards from the extremity of Chiappa Point. The white light is visible 21 miles and the red light 19 miles in clear weather. (For sectors, see Light List and chart.) The lighthouse is a signal station.

Wreck.—The Italian schooner *Ferdinando* has been wrecked off Chiappa Point, and the entrance to the port is strewn with wreckage which is dangerous to navigation.

Life-saving station.—There is a life-saving apparatus at Chiappa Point Lighthouse.

Directions.—A vessel from the northward bound for the Gulf of Porto Vecchio by day should give St. Cyprien Point a berth of about 600 yards or pass midway between it and Pecorella Tower; when about 700 yards southward of the point, and Pecorella Tower bears 82° steer for the anchorage in 5 or $5\frac{1}{2}$ fathoms water, about 400 yards from the shore westward of Arena Point; or by keeping along the eastern shore nearly 200 yards off, a vessel of about 18 feet draft may proceed on and anchor in $3\frac{1}{2}$ or 4 fathoms, mud and weeds, 300 or 400 yards northward to north-northwestward of Ziglione Islet, or midway between the two anchorages. Large vessels which require shelter from westerly winds anchor eastward of Arena Point in 8 or 9 fathoms.

From the southward a vessel will have no difficulty by day in passing midway between the Chiapino and Pecorella Rock towers,

the channel being nearly $\frac{1}{2}$ mile wide, steering for Arena Point, as before mentioned. At night, Pecorella Rocks are avoided by keeping the white light of St. Cyprien or Chiappa in sight as requisite. The red sector of both lights covers the rocks.

The north coast of Porto Vecchio is skirted by shoals of sand and weeds, upon some of which there are from 2 to 6 feet of water; the 3-fathoms curve of soundings extends 750 yards southward of Benedetto Point and thus narrows the entrance to the port to about 600 yards. These shoals continue along the northern shore to the rocks fronting the town. The southern shore is less encumbered, and by giving it a prudent berth there is nothing in the way to the anchorage which is a little westward of Arena Point, or farther in, off Ziglione Islet, lying between the town and Arena Point, surrounded by a tongue of sand and weeds which projects 500 yards from the southeastern shore. Entering at night do not enter the red sector shown westward from St. Cyprien Lighthouse over the Benedetto Bank, and by day pass 300 yards southward of the red buoy which marks the bank.

In the inner part of the gulf, vessels though landlocked are exposed to land winds which at times blow with great violence, and for which they should be prepared.

The mark for the gulf is a high arid mountain in the interior, the summit of which is rugged or broken, and nearly always covered with snow; it is a little northward of the entrance and nearly on the parallel of St. Cyprien Tower. It will also be known by Mount Cherbio, 1,066 feet high, which is 2.6 miles inland of Chiappa Point, by the lighthouse on this point, and by the town and walls of Porto Vecchio.

Life-saving station.—There is a life-saving apparatus at Porto Vecchio.

Cerbicale Point and Islets.—At $2\frac{1}{2}$ miles 209° from Chiappa Point is Cerbicale Point, surrounded with rocks. The intervening coast is high, rugged, and bold, broken at intervals by small beaches, with 8 to 10 fathoms water not far from the rocks. An islet named Farina lies close to the shore, about 1 mile from Chiappa Point.

Cerbicale Islets are a group of four small islets called Forana, Maestro-Maria, Piana, and Pietricaggiosa. Extending $1\frac{1}{2}$ miles in a northeastward and southwestward direction, they lie about $\frac{1}{2}$ miles from this part of the coast. The two extreme islets are high and rugged, with detached rocks round them, while those between are low and flat. Between Forana and Maestro-Maria there are $6\frac{1}{2}$ fathoms water in mid-channel; between the latter and Piana only 9 feet; and between Piana and Pietricaggiosa, which is the widest passage, there are 8 fathoms. Piana and Maestro-Maria are surrounded by a narrow bank, and at less than 300 yards from the northwest point of the

latter is a rock with 1 foot water on it and irregular soundings around 300 yards westward of the southwestern end of Piania is a rocky patch of $1\frac{1}{2}$ fathoms. Forana and Pietricaggiosa have also narrow banks around them and about $\frac{1}{2}$ mile westward of the latter is a rock with $2\frac{1}{2}$ fathoms water on it.

Vacca Islet and rock.—A high round steep islet lies about 1,100 yards 108° from the southern end of Forana Islet; it is skirted with rocks, and between it and Forana there are from 9 to 17 fathoms water. At the distance of 1,600 yards $158^\circ 30'$ from Vacca Islet is the center of a rocky shoal of the same name, with 12 feet water on it and from 14 to 18 fathoms close-to, but patches of 15 feet exist both northward and southward of this rock.

Buoy.—This danger is marked by a black buoy with cylindrical topmark, moored in 12 fathoms water, 100 yards 192° from the shoalest rock (12 feet). This buoy is frequently washed away.

Toro Rocks, rather more than 2 miles 147° from Pietricaggiosa, and $2\frac{1}{2}$ miles 186° from Vacca Islet, are a small group of islets or rocks 131 feet high, nearly united, and steep-to.

Toro Shoal.—A rocky shoal of whitish appearanec, with only 9 feet water on it and deep water around, lies 700 yards 102° from the Toro group. There are 15 fathoms, rock, between the Toro and Vacca Rocks.

Buoy.—A black spindle buoy, with cylindrical topmark, moored in $12\frac{1}{2}$ fathoms water, marks the southeastern edge of the shoal.

Anchorage.—If convenient, vessels may pass through the channel between the Cerbicale Islets and the main, but those of moderate size should keep nearer the coast than the islets to avoid the shoal patches off Piania and Pietricaggiosa Islets. The rock awash off the northwestern end of Maestro-Maria will be seen.

There is anchorage for small vessels between the Cerbicale Islets and the shore, sheltered from the eastward, in front of the opening between Piania and Maestro-Maria. Large vessels may anchor in the middle of the channel in about 14 fathoms, weeds.

Aciajo Point.—Nearly 2 miles 237° from Cerbicale Point is Aciajo Point, low and surrounded by rocks. The intervening shore is skirted with rocks and forms two slight bays with sandy beaches and low marsh land, in the southern and smaller of which is the islet of Folaca. A rock with $2\frac{1}{2}$ fathoms on it lies about 700 yards 188° from Aciajo Point.

St. Giulia Bay.—The small Bay of St. Giulia is $1\frac{1}{2}$ miles south-westward of Aciajo Point. The bay is open to the southeast, is about $\frac{2}{3}$ of a mile deep, scattered with rocks and shoals, and terminates in a sandy beach; there is anchorage at the entrance with off-shore winds in 8 or 9 fathoms.

Segno Point forms the southern extremity of Giulia Bay, and separates it from Porto Nuovo on the south. It is bold and steep-to, with some white patches at its base.

Porto Nuovo.—From Segno Point a high bold coast trends to the southwestward to the head of the bay named Porto Nuovo, and then eastward to Carpicce, the southern point of entrance. This bay is divided near its head by a rocky spur into two small coves. Calanque del Gionco, the eastern, affords the better shelter, and small vessels load with coal here; there are some rocks on its western side. Water can be obtained from a stream flowing into the head of the calanque.

Porto Nuovo (proper), the western cove, has a sandy beach at its head outside a small lagoon, and a few rocks, but the anchorage is open eastward.

There is a depth in the bay northward of the coves of about 9 fathoms, sand, weed, and rock bottom.

Rondinara Point.—About 1 mile southward of Carpicce Point is Sponsaglia Point, with a small hill on it and a white tower in ruins. The point is the termination of the elevated mountain of the same name, and at its foot are two little islets or rocks; at $\frac{1}{2}$ mile from this part of the coast there are from 23 to 28 fathoms water. At $1\frac{1}{4}$ miles southward is Rondinara Point, the termination of a small, steep, high peninsula, connected to the coast by a neck of sand; it is of a reddish color and at its foot on the eastern side is an islet, about 20 feet above the sea. The shore between the two points is bordered by rocks.

Port Rondinara.—On the northern side of the peninsula is a small cove about $\frac{1}{2}$ mile deep, with a sand beach at its head; it is open to the eastward and fit only for small coasting and fishing boats. A rocky shoal with 5 feet water on it lies near the head of the cove southward of a small round islet. In the middle of the cove there are $7\frac{1}{2}$ to 9 fathoms water shoaling gradually toward the shore.

Pointe Capicciolo is the extremity of a peninsula, nearly 1 mile broad, which extends northeastward $2\frac{1}{4}$ miles on the southeastern side of Golfe de Santa Manza. About $\frac{1}{4}$ mile within the point is a rocky peak, 344 feet high, resembling in shape a bishop's cap. Southward of this peak is a ravine, from which the land again rises suddenly to a little hill, 417 feet high, on which is Tour de Santa Manza in ruins; on the foundation is a heap of stones, and near it a masonry pillar.

Gulf of Santa Manza extends southwestward about 3 miles from its entrance between Pointe Capicciolo and Presqu'île de Rondinara, $2\frac{1}{4}$ miles to the northward; it is open eastward, but affords shelter from other directions. Pointe della Nave, about $1\frac{1}{2}$ miles southwest-

ward of Pointe Capicciolo, has a noticeable white rock off it. Cape Blanc, 1,400 yards north-northwestward of Pointe della Nave, is a white headland, 151 feet high, a rocky spit extends 800 yards north-eastward from it and terminates in a rock with $1\frac{1}{4}$ fathoms water.

The inner part of the gulf extends $1\frac{1}{4}$ miles southwestward from between Pointe della Nave and Cape Blanc, with depths of from 11 to 15 fathoms in the entrance, decreasing to $3\frac{1}{2}$ fathoms near the head; the north shore is bordered by a rocky bank to the distance of 200 yards; Calanque de Stentino, about $\frac{3}{4}$ mile from Cape Blanc, extends $\frac{1}{2}$ mile westward, and is narrow with almost vertical sides; it has 10 feet water at its head, but the entrance has a bar with 5 feet water and many rocks outside it. The head of the gulf is a sand beach, and a rock with 2 feet of water lies about 400 yards off its southern end. Tlot du Toro open northwestward of the southeastern shore of the gulf leads northwestward of it.

Water can be procured from wells near the northwestern end of the beach, and from the streams, which rarely dry, flowing into the head of the gulf.

The shore from Cape Blanc trends north-northwestward 1 mile to Étang de Balistro; for $\frac{1}{4}$ mile from the cape it is a white limestone cliff and thence a sand beach; from Étang de Balistro the shore trends northeastward $2\frac{1}{2}$ miles to Presqu'île de Rondinara, and is rocky, its slopes, moderately steep, being covered with a little wood.

Anchorage.—There is anchorage northward of Cape Blanc, near Étang de Balistro, but there is better shelter about 300 yards off Pointe della Nave; a northerly swell is felt here, but the sea does not become very heavy. Small vessels anchor near the head of the gulf, sheltered except from strong northeasterly winds.

Anchorage.—Large vessels generally anchor at the entrance to the port, about 400 yards northward of Nave Point, in 14 fathoms, or a little farther northward in about 18 fathoms, weeds. Small vessels go farther in near the head of the port, and anchor in 4 to $5\frac{1}{2}$ fathoms.

Capicciolo Point is the termination of remarkable elevated land at the southeastern extremity of Corsica, which extends about 4 miles in a northeastward and southwestward direction. About $\frac{3}{4}$ mile southwestward of the point is a tower in ruins.

Sprono Point.—At $4\frac{1}{4}$ miles southwestward of Capicciolo Point is Sprono Point, cliffy and projecting to the southward. The intermediate coast is skirted by shoals, rocks, and islands, between which are passages for coasting vessels. On the northern side of Sprono Point the shore forms a bend known as Piantarella Bay, in front of which is Piana Island; between the island and the coast there is shallow water, and a reef extends 400 yards from its southern side.

Beacon.—A beacon painted black in the direction of Piantarella Channel and white in the opposite direction, is erected on the extremity of Sprono Point, which, when in range with the black side of the beacon on Piana Island, bearing 229° , serves as a leading mark for Piantarella Channel.

Beacon.—**Prêtre Rock**, lying 800 yards 240° from Sprono Point, is a small round rock, separated from the shore by a channel about 400 yards wide and 9 fathoms deep; it is marked by an iron beacon surmounted by a sphere, painted in red and black horizontal bands.

Gavetti Rocks, lying $1\frac{1}{2}$ miles to the southwestward of Cape Capicciolo, and 466 yards from the shore, is a group of islets or rocks 13 feet high extending nearly 200 yards east and west. These islets are surrounded by shoal water and reefs to the southwest and southeast and should not be approached nearer than 600 yards, or into less than 6 fathoms water.

Piantarella Pass, between Gavetti Rocks and the coast, is reduced to about 100 yards in breadth by the rocks on both sides, the depth of water in the middle being from $3\frac{1}{2}$ to 4 fathoms. A small vessel having passed through the passage should keep within about 400 yards of the shore until nearly abreast Ratino Island, then steer out midway between the rocks extending westward from this island and Piana Island.

Directions.—From the westward, pass southward of Le Prêtre beacon (latitude $41^{\circ} 22' N.$, longitude $9^{\circ} 13' E.$), and steer eastward until past Rocher la Vachetta, and Tignosa di Ratino beacon is in line with the extremity of the land southward of Pointe Capicciolo; then steer to pass a little westward of Tignosa di Ratino beacon, and when the black wall beacons on Pointe Sprono and Île Piana are in range, 229° , keep them so astern until Santa Manza tower bears 319° , when the passage will be cleared.

The passage is only practicable by day, and it must not be attempted when the leading beacons are obscured. The leading line passes very close to the western rock of Écueils de Porraggia; therefore, do not go to the southeastward of the line.

Porraggia Islets.—At $\frac{3}{4}$ mile 153° from the largest Gavetti is a high islet extending north and south, nearly 300 yards off the northeastern end of which is another smaller islet lying east and west, and nearly united to the former; they are named Porraggia Islets. Two rocks, 3 feet above the sea, lie rather more than 300 yards to the north-northeastward of the smaller islet. A rocky shoal with $1\frac{1}{2}$ fathoms water on it lies about 150 yards northeastward of the rocks. There are also four other rocky shoals near the Porraggia Islets—one of $1\frac{3}{4}$ fathoms about 300 yards to the eastward of them; another of 4 feet about 200 yards to the westward; a third of 5 feet about $\frac{1}{4}$

mile to the southwestward, and a fourth of $2\frac{1}{4}$ fathoms 700 yards to the southwestward. Other rocks lie around the islets close in.

Shoals.—A dangerous shoal with only 3 feet water on it lies 1,200 yards 268° from the northern extremity of the larger Porraggia Islet. Another rocky shoal of 2 fathoms lies about 200 yards 153° from the former danger.

Beacon.—**Piana Island**, 800 yards 46° from Sprono Point, is low, 400 yards long northeast and southwest, with a small hill near the center on which is a beacon, painted black, in the direction of Piantarella Channel and white in the opposite direction. It is 300 yards from the coast, with from 1 to 7 feet water between; a spit on which is from 5 to 18 feet water extends nearly $\frac{1}{2}$ mile in a northeast direction from the northern point of the island, leaving a channel between it and Ratino Rocks of about 200 yards in width. Several rocks lie off its southern side; the largest and outer, named Vacchetta, is distant 350 yards.

Piantarella Bay.—Piana Island, together with the coast, forms a bay named Piantarella, which affords good shelter from nearly all winds, for vessels under 15 feet draft.

Anchorage.—There is anchorage at about 250 yards northeastward of Piana Island in from 18 to 28 feet weeds; the depth decreases rapidly. The anchorage is well sheltered from westerly winds, and partly from the eastward, by the islands and shoals fronting it. In rounding Piana Island a vessel should pass at least 700 yards southward of it.

Beacon.—**Ratino Island**, 1,100 yards eastward of Piana Island, is irregular in form, extending eastward and westward nearly $\frac{1}{2}$ mile, and is surrounded by islets and rocks. Two of these are small, 2 feet out of water, nearly united, and appear like two buoys; they bear west-northwestward distant rather less than 400 yards from the western end of Ratino; rocks extend 300 yards northward of these, on one of which is a black iron beacon with a cylindrical topmark. At 700 yards 29° from Ratino is a rocky shoal, which dries 1 foot, and 400 yards 26° from the northern point of the island is a rocky shoal of $2\frac{1}{4}$ fathoms. The island should not be approached on the southeastern, southern, or southwestern sides within $\frac{1}{2}$ mile.

Piantarella Channel, between the islets of Gavetti and Porraggia, is reduced in breadth to less than 800 yards by the shoals on each side; in the middle of the passage there are from 10 to 18 fathoms.

Directions.—A vessel proceeding through this passage should pass about $\frac{1}{2}$ mile off Capicciolo Point, and steer for Porraggia Islets, bearing 200° ; when the largest of the Gavetti Islets bears 276° alter course to 220° for the beacon on the shoal northwestward of Ratino Island, passing nearly 400 yards westward of Porraggia

Islets, then bring Sprono Point beacon in range with the beacon on Piana Island, bearing 229° , and steer with this mark in range, and it will lead 200 yards southward of the 2-fathom shoal to the westward of the Porraggia Islands, and 400 yards to the northwestward of the shoal, which dries 1 foot, lying northeastward of Ratino Island; pass 200 yards westward of the beacon on the shoal northwestward of that island, after rounding which a vessel may steer out about 192° , or anchor if necessary northeastward of Piana Island. When navigating in the vicinity of these islands and shoals a sailing vessel should be ready to anchor in the event of calms or light winds, as the currents are sometimes strong.

Cavallo Island, the western extremity of which is 800 yards southward of Ratino Island, is the highest and largest of the group, being 1 mile in extent east and west, of a very irregular figure, forming various coves and projecting points, and, with the exception of the east end, is surrounded with rocks and shoals. The narrow channel between it and Ratino carries 5 fathoms water, but can only be used by those with local knowledge and in small vessels.

Perduto Islets, situated 1.3 miles eastward of Cavallo Island, have rocks on their northern and southern sides, and shoal water extends 600 yards 296° , 300 yards 226° , 200 yards 147° , and 200 yards 350° from the islets. Midway between the islets and Cavallo Island there are from 23 to 30 fathoms, and the passage may be taken, if convenient, by a vessel of any size.

Perduto Rock.—At $\frac{1}{2}$ mile 119° from Perduto Islets is a rock of the same name, scarcely visible above water, but on which the sea breaks. About 200 yards 125° of it is another rock with 2 fathoms water on it; between Perduto Rock and the islets there are 14 to 18 fathoms.

Lavezzi Island.—About $\frac{1}{2}$ mile 198° from Cavallo is the northern end of Lavezzi Island. It is somewhat smaller and lower than Cavallo, of an irregular figure, rugged, with whitish cliffs, and is surrounded with rocks and shoals; near the center is a round hill. On Cape Ciotto, the southwestern end of a small island nearly joined to the western end of Lavezzi, is a square pyramid 51 feet high, which can be seen at some distance. Nearly 200 yards from the southern point of Lavezzi is a reef awash, and at 200 yards from the point is a shoal of $1\frac{1}{2}$ fathoms; a short distance eastward of the point are two rocks above water, with shoal water near them. The passage between Lavezzi and Cavallo Islands is nearly choked with rocks and shoals and is available only (with local knowledge) to small vessels.

Cavallo Shoal, a rock with only 15 feet water on it, lies 46° nearly 700 yards from the northeastern extremity of Lavezzi Island.

Light.—From a square tower on Becche Point, the southern ex-

tremitry of Lavezzi Island, at an elevation of 90 feet above the sea, a fixed light, with red and green sectors, is exhibited. The light shows red covering Lavezzi Rock; green covering all the dangers to the northward from Perduto Rock on the eastward to Prêtre Rock on the westward; and white in other directions. The white and red light is visible 15 miles, and the green light 13 miles. (For limits of sectors see Light List and chart.)

Life-saving station.—There is a life-saving apparatus at Lavezzi Island Lighthouse.

Lavezzi Rock and beacon.—At 1 mile 197° from the lighthouse on Lavezzi Island is a dangerous rocky shoal of the same name with 8 feet water on it; it is steep-to on the southern side, but on the northern it is foul. A ledge of rocks about 10 yards in extent and having $4\frac{1}{2}$ fathoms least water, with 9 to 10 fathoms close-to, is situated 650 yards 38° from Lavezzi Rock Beacon. Between the ledge and island there are 9 fathoms. A rock of small extent, with a depth of $4\frac{1}{2}$ fathoms on it, lies with Lavezzi Rock Beacon bearing 270° , 440 yards, and Lavezzi Lighthouse 2° .

A rock, with a depth of $4\frac{1}{2}$ fathoms on it, lies 500 yards 68° from Lavezzi Rock Beacon.

A rock, with a depth of 4 fathoms on it, lies 400 yards 192° from Becche Point, the southern extremity of Lavezzi Island.

A rock, with a depth of 4 fathoms on it, is situated in a position with Lavezzi Island Lighthouse bearing 65° , 940 yards, and Pyramid bearing 351° .

A circular stone safety beacon 54 feet high, with a refuge and lantern on top, marks Lavezzi Rock. The beacon is painted in three red and three black horizontal bands. Vessels sometimes use the passage between Lavezzi Rock and Lavezzi Island by keeping in mid-channel, but the safest course is to take the main channel southward of Lavezzi Shoal, between the shoal and Razzoli Island.

The beacon commemorates the loss on Lavezzi Rock in 1855 of the French frigate *Semillante*. A cemetery in a sandy cove on the island contains the bodies of those who perished.

Light.—A group occulting white light, with red and green sectors, is exhibited, at an elevation of 54 feet above the sea, from a red cylinder, with red and black bands and white lantern. The light is visible 7 miles (unwatched). (For sectors see Light List and chart.)

Lavezzi Shoal.—A bank of less than 10 fathoms extends nearly $\frac{1}{2}$ mile southward from the rock: on its extremity is a small patch having only 28 feet water over it 800 yards 150° from the beacon.

Clearing marks.—The Croix de la Trinité (on a conical hill north-westward of Bonifacio) kept open of Cape Pertusato bearing 319° leads southwestward of Lavezzi Rock, and the eastern side of Lavezzi Island in range with the highest part of Cavallo bearing 341° leads

eastward of the shoal. At night Razzoli white light bearing 85° will lead along $\frac{1}{2}$ mile southward of the rock and shoal, or keep southward of the southern limit of the red sector which is thrown over the rock from that light. A red sector of light is also (as before mentioned) thrown over the rock from Lavezzi Island Light. The navigator may therefore be sure that he is not near this danger when one of the lights is seen white, but should both red lights be seen the course must be altered immediately.

Razzoli Light.—An occulting white light, with red sector, is exhibited, at an elevation of 282 feet above the sea, from a white tower, 89 feet high, with square base. The white light is visible 18 miles and the red light 15 miles. (For sectors see Light List and chart.)

Bonifacio Strait.—For description of, and directions for, see page 461.

Corsica—West coast.—**Cape Pertusato**, named also Cape Bianco, is the southern extremity of the island of Corsica. It is remarkable by being pierced through, and the whiteness of its vertical cliffs, from which it derives its name, is very marked in contrast with the dark surface. At the foot of the cape and nearly connected to it, is St. Antoine Islet, a curious white pinnacle rock 75 feet high. Rocks skirt the shore from Sprono Point to Fiumara Cove.

Fiumara Cove lies 1 mile westward of Sprono Point; a small rocky shoal with $2\frac{1}{2}$ fathoms of water over it is situated to the westward of it.

Telegraph.—A submarine telegraph cable is landed at the head of this cove, the position being marked by two beacons, painted blue and white in horizontal bands, with circular white topmarks. These beacons, when in range bearing 57° , lead close southward of the line of cable.

Water.—About $\frac{1}{2}$ mile eastward of Cape Pertusato is a cove with a sandy beach, where there is an abundant supply of good water.

Cape Pertusato—Light.—From a square gray tower, 52 feet in height, situated on the summit of this cape, is exhibited, at an elevation of 325 feet, a group flashing white. This light is visible 25 miles, except when partially obscured by the land. It bears 315° , 4.3 miles from Lavezzi Rock beacon.

Lloyd's signals.—There is a Lloyd's signal station on Cape Pertusato.

Semaphore.—To the north-northwestward of the lighthouse there is a semaphore station, 404 feet above the sea.

Port Bonifacio.—The entrance to Port Bonifacio, between Presqu'île de Madonetta, on the west, and Pointe Saint Antoine, on the east, is about 300 yards wide, with depths of from 11 to 17 fathoms; it is difficult to distinguish from a distance, but it is marked by the lighthouse of La Madonetta, and large hollows in the white cliffs,

which appear as black triangular spots, behind it on the west, and the town and citadel on the east.

About 400 yards inside the entrance the port turns eastward 1,600 yards, and its width decreases to about 100 yards; there are general depths of from 6 to 11 fathoms, but above the town it shoals to $4\frac{1}{2}$ fathoms about 200 yards from the head. On the northern side, which is steep and bold, are two creeks; Calanque de l'Arenella, the western one, is very shoal, but Calanque de la Catena, the other, extends about 300 yards northward, with depths 8 to 5 fathoms to about half way within; a floating dock is moored here.

An area at the head of the port has been dredged to 20 feet; a torpedo station is established here, and walls have been built round it, from which five wooden piers extend. There are three quays; the outer one on the southern side is about 60 yards long, and vessels of 12 feet draft can lie alongside; the one on the northern side is 90 yards long, but vessels can not lie within 30 feet of it; the inner quay on the south side can not be approached nearer than 40 feet; on this quay is a fountain and the customhouse. The port office is a little eastward of the outer southern quay. Along both shores are bollards for mooring vessels.

Buoys.—Four mooring buoys are placed on the northern side of the port, two on each side of Calanque de l'Arenella. A warping buoy lies in the entrance to Calanque de la Catena.

Directions.—Caution is necessary in entering during strong south-westerly winds, as inside the entrance the sea is nearly smooth, but the squalls are very violent. Vessels using the mooring buoys anchor in midchannel, and secure their sterns to the buoys, leaving the southern side of the channel clear for navigation; those over 150 feet long proceeding above Calanque de la Catena must swing southward of the calanque, where there is room to turn a vessel from 200 to 260 feet long, and go up the inner part of the port stern first.

Bonifacio town is situated on the summit and eastern part of the peninsula which forms the southern side of the port; it is grouped round the church of Sainte Marie Majeure, which has a square steeple surmounted by a small dome; its eastern side is limited by the white wall of the fortifications, and the southern side is on the edge of the cliffs. Westward of the southern part of the town is the large round Tour de Bonifacio, from which the steps of Roi d'Aragon descend vertically down the cliff to the sea. A little northwestward of the tower is the octagonal steeple of Saint Dominique, and barracks with a central clock tower; farther westward is an iron windmill, and near the citadel at the extreme of the peninsula is the low conical spire of Saint François. The population was 3,663 in 1911.

Bonifacio Approach—Fairway reserved for traffic when submarine vessels are exercising.—When the flag with a yel-

low and a red horizontal stripe is hoisted at the signal stations or on vessels escorting submarine vessels, to indicate that the latter are exercising submerged, all vessels wishing to enter or leave the Port of Bonifacio are earnestly requested to make use of the fairway, defined below, in which submarine vessels are prohibited from exercising submerged.

This fairway is limited as follows:

On the north by the alignment 63° from Catena Old Battery and the cliffs on the western side of the entrance to the port.

On the south by the alignment 53° from Catena Old Battery and the cliffs on the western side of the entrance to the port.

On the west by a line joining Cape Feno and Cape Pertusato.

The above limits have not been placed on the chart plates.

Directions.—The entrance to the port will be known by the mountain of Trinité, which rises westward, a long mile within Cape Feno. Madonetta Point terminates in gray cliffs and is lower than St. Antoine; on it is a chapel and lighthouse, and on its western side is a large cave. St. Antoine Point is steep and dark, with a battery, a convent, and other buildings on it and a large cave at its foot. Having the several buildings and the caves in sight, steer midway between the latter until the mouth of the port is open, which can be entered only with a fair wind by keeping in midchannel. In the middle of the entrance there are 16 fathoms, which gradually decrease to 7 fathoms abreast the town and 5 and $3\frac{1}{2}$ fathoms near the head of the port. The bottom is weed. A warping buoy is moored off the entrance. During the maneuvers of 1897 the French naval vessel *Terrible* entered the port of Bonifacio drawing 24 feet 7 inches' aft with a displacement of 7,600 tons.

Trade—Communication.—Coral fishing is carried on. There is communication by coach to Ghisonaccia and from thence by rail to Bastian daily. Steamers used to run on alternate Mondays to Ajaccio.

Light.—From a square red tower 36 feet in height, on building situated on Madonetta Point, is exhibited at 98 feet above the sea, a fixed white light visible 11 miles. (See Light List.)

Dock.—A floating dock is moored in Catena Inlet. See, also, Appendix I.

Supplies are limited to vegetables. Water can be procured from a fountain near the quay, but only in small quantities. There is no coal.

Lifeboat.—There is a lifeboat and life-saving apparatus at Bonifacio.

Sea level.—In the port of Bonifacio, at irregular intervals, a rise and fall of water, often amounting to 2 and 3 feet, and on some occasions as much as 4 feet has been observed. During the winter the

rise is even greater, the water completely covering the quays. There is no appreciable lunar tide at any time.

Local authorities at Port Bonifacio state that the rise and fall of the water is a foretelling of the weather that may be expected. That a rise indicates an easterly current running in the strait before westerly winds, which will follow in a few (seldom less than four or five) hours. That the fall of the water during fine weather will indicate in like manner a westerly current running before easterly winds, and that the amount of the rise and fall will indicate the force of the expected wind.

It is also observed that the water commencing to fall while a strong westerly wind is blowing is an indication that within a few hours the wind will subside and, if the fall continue, easterly winds follow.

Cape Feno is rugged, foul, and projects to the southwest. Immediately over the cape is Mount Trinité, the eastern peaks of which are the highest; on one of them is a cross, known as Croix de la Trinité. Between Bonifacio and Cape Feno the coast is high and mountainous; midway is Paragnano Cove, about $\frac{1}{2}$ mile deep, with 14 fathoms water at the entrance, shoaling to 2 fathoms at its head, and open to the westward. A short distance eastward of this cove is another with two large rocks at its mouth; small coasting vessels and fishing boats find shelter within it from all winds.

There is a small cove on the eastern side of Cape Feno used by fishing boats, and on the northwestern side of the cape is a cove in which are rocks above water. The shore in the vicinity of Cape Feno should not be approached nearer than $\frac{1}{2}$ mile.

Rock southwestward.—A rock, with a depth of $4\frac{1}{2}$ fathoms over it, has been discovered 750 yards 223° from Cape Feno Lighthouse.

Light.—From a square white tower 30 feet in height, situated on the extremity of Cape Feno, at an elevation of 65 feet above the sea, a fixed white light is exhibited, only visible over an arc of 32° , in the direction of the Moines or Monachi Rocks, the brilliancy decreasing from the center of the arc; it should be seen 13 miles. This light is said to be frequently hidden by fogs in the month of May. (See Light List.)

Life-saving station.—There is a life-saving apparatus at Cape Feno Lighthouse.

Ventilegne Point, 3 miles northward of Cape Feno, and a large headland named Testa di Gatto, about $\frac{1}{2}$ mile westward of it, form the termination of a high mountain; both points are skirted with rocks, and 700 yards westward of the latter is the Testa di Gatto Rock, above water with a reef outside it, and others between it and the headland.

Ventilegne Bay.—The coast between the cove northward of Cape Feno and Ventilegne Point falls back to the east-northeastward

and forms a bay about 2 miles deep, in which are several shallow coves with beaches, but used only by fishing boats. At $1\frac{1}{2}$ miles from the cove of Cape Feno, and on the southern side of the bay; are some islets and rocks close to the shore; one of the latter northward of the inner islet is 2 feet high, and outside it is a patch with 4 feet water on it. These islets should have a wide berth. Vessels taking shelter in this bay from easterly winds anchor in the middle, or, rather, toward the north shore, in from 11 to 14 fathoms, weeds. A rock with 1 foot water on it lies 250 yards westward of the inner point of the outer cove, on the north shore.

A ledge of rocks, the shoalest part of which is awash, is situated 1,600 yards 344° from the northwesternmost of the Tonnara Islands, with a head, on which there is a depth of 5 feet, about 50 yards southeastward of the rocks and depths of from 1 fathom to $1\frac{1}{2}$ fathoms on the extremity of the ledge about 80 yards from it in the same direction.

Figari Bay.—Figari Point, $1\frac{1}{2}$ miles 299° off the headland of Testa di Gatto, is rugged and bordered with rocks which extend 450 yards off. Between the two points an inlet runs nearly 2 miles to the northeastward, called Figari Bay. It is encumbered with numerous rocks; the land at its head is marshy and a stream flows into it.

Bruzzi Islets.—At about $\frac{1}{4}$ mile off Bruzzi Point is a cluster of small islets or rocks of the same name. Shoal water extends 600 yards to the southward and 400 yards to the westward of the islets. The ground is also foul between the islets and the point. The shore between Bruzzi and Figari Points forms a bay $\frac{3}{4}$ mile deep and open to the southwest, where coasting vessels anchor with offshore winds in 7 or 8 fathoms, weed.

Olmeto Point is rugged, bold, skirted with rocks, and has on it a white tower. It is the termination of a high mount of the same name. The coast between Bruzzi and Olmeto Points is high and rugged and forms two coves named Arbitro and Fornello, the former being the eastern and smaller, is only fit for fishing boats: The latter is formed by the eastern declivity of Mount Olmeto, and the western of Mount Arbitro, and is about 800 yards deep in a northerly direction, affording shelter for small vessels from northerly winds. The eastern shore is skirted with rocks. At the entrance about 300 yards from either side is a rocky patch with 3 feet water on it. When entering, keep along the western shore until within the 3-foot rock, and anchor in from $2\frac{3}{4}$ to 6 fathoms, weeds. The point terminating from Mount Arbitro on the east is surrounded with rocks which extend 200 yards off it.

Roccapina Point.—From Olmeto Point the coast is high and rugged and trends 288° to Roccapina Point, forming several small

coves, rugged points, and small beaches. Roccapina Point is low and projects to the southwest, terminating in two islets. On the elevated land behind it is the tower of the same name, and about 300 yards farther to the northeastward is another tower in ruins.

The principal cove is on the eastern side of the point, but it is obstructed by rocks and fit only for small coasting vessels.

Prêtre Rocks and Beacon.—Several rocks lie off this part of the coast; the most remarkable, named Prêtre, is above water and is marked by a beacon tower 11 feet high, painted in red and black horizontal bands. It bears 276° 1,400 yards from Olmeto Point, and is $\frac{1}{2}$ mile from the coast. A rock with 14 feet water on it lies a little more than 200 yards southward of the beacon. In cases of necessity vessels may pass between it and the land in 7 or $7\frac{1}{2}$ fathoms water.

Olmeto Rocks.—At the distance of $1\frac{1}{4}$ miles 237° from the beacon tower on Olmeto Point, is a rock awash surrounded by others having 3 and 8 feet water on them, named Great Olmeto. They extend northeastward and southwestward nearly $\frac{1}{2}$ mile; the channel between them and the Prêtre is 400 yards wide with depths of from 12 to 16 fathoms.

At about 1,400 yards 237° from the Great Olmeto Rock is the Little Olmeto Rock with 12 feet water on it, and from 25 to 30 feet close to.

A shoal with $2\frac{3}{4}$ fathoms on it lies 170 yards westward of Little Olmeto Rock.

Caution is necessary while navigating in this neighborhood.

Monachi Rocks (Les Moines)—Beacon.—A group of islets or rocks surrounded by reefs extending over a space of nearly 1.7 miles in a northeast and southwest direction, lies 198° distant nearly 2 miles from the tower of Roccapina; they have small channels between them, through which only fishing boats can pass; the largest islet is 22 feet high. The southwestern danger of the group has only 4 feet water on it and lies about $\frac{3}{4}$ mile 226° from the largest islet, and $2\frac{3}{4}$ miles from Roccapina Point; it is marked by a black beacon tower surmounted by a cylinder. There is no inconvenience in passing between these dangers and the coast during fine weather, as the northern rocks are nearly $1\frac{1}{2}$ miles from Roccapina Point and the depth of water from 9 to 24 fathoms; but at other times Olmeto and Roccapina Points should have a berth of $3\frac{1}{2}$ or 4 miles. The channel between the Monachi Group and Little Olmeto is $1\frac{1}{4}$ miles wide, with depths of from 16 to 34 fathoms.

Monachi Rocks—Beacon.—A new beacon on the rocks has been completed; it is in the form of a white tower, consisting of two truncated conical sections of different diameters, one above the other, the whole structure being 61 feet high; it is named Moines Tower.

Light.—A fixed red light, elevated 80 feet above the sea and

visible 11 miles, is exhibited from Moines Tower, of white masonry, on Monachi Rocks. (Unwatched.) (See Light List.)

Caution.—A vessel will pass to the westward and southward of the Monachi Rocks by keeping outside of the red and white alternate flashing lights shown over an arc of 2° from Aquila Point Lighthouse; also the southern limit of light shown from Cape Feno passes about 3 miles southward of the beacon on the outer rock. (See Light List.)

Roccapina Bay.—At $1\frac{1}{2}$ miles northwest of Roccapina Point is Mortoli Point, a rocky headland, nearly isolated; the intervening coast forming a bay, the eastern short of which is a steep sandy beach, but the northern is rugged and skirted with rocks extending 600 yards offshore. The beach, $1\frac{1}{2}$ miles in length, begins a little to the northward of Roccapina Point and terminates at a hill about half the distance between this point and that of Mortoli. The bay affords shelter from northerly winds around by east to southeast; anchor in the middle in 8 to 11 fathoms, sand. The Ortole River runs into the bay at the northern end of the sandy beach.

Mortoli Bay.—Nearly 2 miles 293° from Mortoli Point is Latonicchia Point, rugged and surrounded with rocks. An islet or rock of the same name lies 400 yards from the point, having a passage between which can be used by coasting vessels. The coast between forms a bay named Mortoli, which extends $\frac{3}{4}$ mile to the northeastward, having a sandy beach, through which runs a stream, at its head. There is anchorage in this bay with northerly winds, in 10 or 11 fathoms, sand. The shore is clear of danger, and the islet of Latonicchia is steep-to on the western side, but a rock with $2\frac{1}{2}$ fathoms water lies to the southward of it, with Roccapina Tower in range with the extremity of Mortoli Point.

At $2\frac{3}{4}$ miles 186° from Latonicchia Point is the center of a rocky bank, less than 1 mile in extent eastward and westward, with 12 fathoms water on it, upon which the sea breaks in bad weather, when it will be prudent to pass outside it. Between it and the point there are from 35 to 45 fathoms, and the same depths between it and the Monachi Rocks.

Port Tizzano.—From Latonicchia Point the shore trends 1 mile northeastward to a small cove and beach, beyond which is a narrow inlet $\frac{1}{2}$ mile deep named Port Tizzano; it has $3\frac{1}{2}$ fathoms at the entrance and $1\frac{1}{4}$ fathoms in the middle and is only fit for small vessels. A fort stands on the western point of entrance, and westward of it, about 200 yards from the shore, is a rock which dries $1\frac{1}{2}$ feet; and a rock with $3\frac{1}{2}$ fathoms over it lies 500 yards 233° from the western extremity of the promontory separating Tromba Cove from Port Tizzano. A small stream runs into the head of the inlet.

Aquila Point.—From Port Tizzano the coast is rugged, high, and

irregular and trends in a west-northwestward direction to Aquila Point; it is skirted here and there by rocks which extend off about 300 yards, and there are two or three coves with small beaches. The Tivella River flows into the sea in the western cove. Aquila Point terminates in a rocky projection nearly isolated and surrounded with rocks, one of which, having only 1 foot water on it, lies 400 yards westward of the point.

Light.—At Aquila Point is exhibited, at an elevation of 164 feet above the sea, a flashing white light with red sector. A sector of flashing red light is shown over Monachi Rocks (Les Moines). Within this sector the light will be obscured by the land as Latoniccia Point is approached, the point being higher than the lighthouse. Through a sector of 2° , or between the bearings of 328° and 330° , the light will show white and red flashes alternately, so that mariners will be thus warned of approaching the dangerous sector. In clear weather the light will be seen from a distance of 19 miles. The lighthouse, 42 feet in height, consists of two towers 49 feet apart and joined by a white building. (For sector see Light List.)

Sénétose Point, $\frac{3}{4}$ mile northward of Aquila Point, terminates in a small peninsula with high land above it, on which is a conspicuous white tower. A rock which dries $1\frac{1}{2}$ feet lies 400 yards 209° from White Rock, the extremity of Sénétose Point; and a rock with 2 fathoms water lies 200 yards 274° from its northwestern extremity. Both this and Aquila Point should be given a berth of a long $\frac{1}{2}$ mile.

Eccica Point projects westward, showing a face in that direction of nearly 700 yards, and is bordered with rocks; an islet of the same name lies 800 yards westward of the point, the channel being obstructed by rocks. The intermediate coast forms a bay, at the head of which is Conca Cove, about $\frac{1}{2}$ mile deep in a northeast direction and terminating in a beach; it is fit only for small vessels with offshore winds. A rock with 2 fathoms of water over it, and 16 to 20 fathoms around, is situated in the entrance to Conca Cove, with Sénétose Tower bearing 141° , distant 1 mile. The shore between this cove and Eccica Point should not be approached too closely, as rocks extend off 700 yards.

Eccica Islet.—A rock, with a depth of $2\frac{1}{2}$ fathoms, exists at a distance of 250 yards 350° from the eastern point of Eccica Islet.

Campo-Moro Point.—About $\frac{1}{2}$ mile eastward of Eccica Point is Agulia Cove, thence follows Manna Molina and Scalono Points, forming two bays; the coast is rugged and rocky. About 1 mile beyond Scalono is Campo-Moro Point and tower, the south point of entrance to the Gulf of Valinco. The coast between the two points is high, rugged, and foul; 700 yards from Scalono a rock awash lies 400 yards from the shore. The Campo-Moro forms a high hill ren-

dered remarkable by a large fortified tower on its summit. Rocks, white and easily distinguished, extend over $\frac{1}{4}$ mile in a north-north-east direction from the Moro, and on the western side are also several islets and rocks.

Anchorage.—There is excellent anchorage, sheltered from the southeastern and southwestern quarters, in the bay on the eastern side of Campo-Moro Point, off a cove about $\frac{1}{2}$ mile southward of the point, in about 11 fathoms, sand and weeds, with the Moro Tower bearing 305° and the village 164° . Small vessels anchor near the shore in $8\frac{1}{2}$ or 9 fathoms. The anchorage is protected by the rocks extending from the point, but the water deepens suddenly; at the head of the bay is a beach and on the eastern side the village of Campo-Moro.

Supplies.—A small quantity of water can be procured, but at some distance from the beach; no provisions can be obtained.

Gulf of Valinco.—At $3\frac{1}{4}$ miles northward of Campo-Moro Point is Porto Pollo Point. Between these points the coast forms a large bay extending $5\frac{1}{4}$ miles eastward, named the Gulf of Valinco. It contains three anchorages; Campo-Moro just described, Porto Pollo eastward of the point of the same name, and Propriano, at the head of the gulf, which last is exposed to westerly winds.

From Campo-Moro the land trends eastward to Cardicciani Point, distant 2 miles; at $\frac{1}{2}$ mile from the point and 600 yards from the coast is a round islet; the latter part of the coast is skirted with rocks.

Tavaria or Valinco River.—At $\frac{3}{4}$ mile eastward of Cardicciani Point is the little village of Portigliolo, at the mouth of the Tavaria or Valinco River. At 400 yards off the mouth of the river is a dangerous rock from which shoal water and rocks extend 400 yards to the westward; and between the rock and Cape Lauroso, farther on, is a group of rocks 500 yards from the beach.

From the entrance to the river a sandy beach trends eastward and northward to Cape Lauroso; the cape is rocky and thence the coast turns eastward to the beach at the head of the gulf. The latter part of the coast is nearly all beach, interrupted by cliffs and two or three islets or rocks.

Port Propriano, nearly 1 mile east-northeastward of Cape Lauroso, is sheltered by Jetée Ouest, a mole, which extends northward about 380 yards from the shore to Rochers de Scoglio Longo, whence Jetée Nord extends east-northeastward about 200 yards. There is a quay on Jetée Ouest, with 20 feet water alongside. On the south shore of the port is a stone landing pier, leading to a small quay, within which are the customs, port, police, and post offices.

The port is not sheltered from westerly to northerly winds, and the sea during strong northwesterly winds breaks over the jetties,

and there is a heavy swell in the port. Easterly winds are accompanied by heavy squalls.

Vessels anchor southeastward of Jetée Nord and off the landing pier in $5\frac{1}{2}$ fathoms, sandy mud.

Lights.—A light is exhibited, at 55 feet above high water, from a white cylindrical masonry tower, 53 feet high, on the north end of Jetée Ouest.

A light is exhibited from a metal column, 19 feet high, on the east end of Jetée Nord.

Buoys.—A white mooring buoy lies about 70 yards northeastward of the landing pier, for the temporary use of vessels which do not wish to anchor.

A red buoy lies eastward of the white buoy, on the edge of the shore bank in $2\frac{1}{2}$ fathoms.

Pilotage.—There is a pilot station at Port de Propriano, within a line from Portigliolo to Pointe de Taravo.

The village of Propriano is small, and the houses are along the road from Sartene to Ajaccio. The church, with a white square belfry, is isolated on a hill behind the houses; eastward of the village is the cemetery where there are several remarkable chapels. The population of the village is about 900.

Propriano is the port of Sartene and Tallano, and considerable quantities of building wood and wine are shipped here.

Supplies.—Provisions can be procured at the village, and water from a fountain near the quay.

Life-saving station.—A rocket apparatus is stationed at Propriano customhouse.

Communication.—The motor car, which runs daily between Bonifacio and Ajaccio, passes through Propriano. A steamer runs three times a week to Ajaccio in fine weather.

Anchorage.—The head of the gulf, which forms the anchorage of Propriano, is $1\frac{1}{4}$ miles in length and $\frac{3}{4}$ mile in breadth; the mouth being between Cape Lauroso on the south, and the point and tower of Aglio to the north-northeastward, distant about 1 mile. The depth at the entrance is more than 35 fathoms, which diminishes gradually to the beach at the head, where a small river runs into the sea; the bottom is principally mud.

Coast.—The north coast of the Gulf of Valinco is less foul than the south; from the mouth of the river at the head of the gulf it trends west, straight to Aglio Point. This point is low and skirted with rocks at a short distance and has a tower on it; $\frac{3}{4}$ mile farther westward is another point, higher and steep, with a beach between, fronted with rocks. At 2 miles farther on is the tower of Bajaccia at the beginning of a sandy beach. The beach is $1\frac{1}{4}$ miles in extent with a bend to the northward, and at its western end the Taravo

River runs into the sea, after winding through the plains of the same name.

Porto Pollo.—Between Porto Pollo Point and the mouth of the Taravo River the coast forms a bay $1\frac{1}{2}$ miles wide with a small beach. It affords excellent shelter with winds from the northwestern quarter (anchoring in from 9 to 11 fathoms, weeds, eastward of a tower in ruins), protected by the land of the cape and the rocks extending from it 800 yards to the southeastward. Large vessels anchor farther out in 14 or 15 fathoms.

From Porto Pollo a road traverses the island to the mouth of Orbo River on the east coast, near Ghisonaccia, the terminus of a railroad to Bastia.

Porto Pollo Point, forming the northern point of entrance to the Gulf of Valinco, is high, rugged, surrounded by rocks and projects to the southwestward; it has the ruins of a tower on its summit. It shows a face to the southward nearly $\frac{1}{2}$ mile east and west, with a reef of rocks extending 700 yards from its western extremity, and another reef 900 yards from the eastern, which terminates in a rock awash. This latter helps to shelter the anchorage of Porto Pollo.

The coast.—About 1 mile 333° from Porto Pollo Point is Pratarella Point, with rocks at its foot; a rock with very little water over it lies 300 yards 237° outside the same, and it has a tower on its summit named Serra di Fero; the intermediate coast forms a bay surrounded by rocks.

About 3 miles to the west-northwestward of Pratarella Point is Cape Nero, high, round, and of a dark color, with a tower on it. At the foot of the cape is a rock awash, and others covered lie 400 yards from the shore. The coast between the two points forms Cupabia Bay, which extends about $1\frac{1}{2}$ miles to the northeastward, terminating in a sandy beach, where a small river runs into the sea. There is anchorage for small vessels, with winds from northwest around by north to southeast, in 10 or 11 fathoms northwestward of the tower on the southeastern side of the bay.

Cape Muro.—At $2\frac{1}{2}$ miles 296° from Cape Nero is Cape Muro, the coast between forming Orzo Cove, terminating in a small beach, which is convenient for coasting vessels with land winds. Cape Muro, a promontory projecting westward, is the termination of high land and presents a front to the westward $\frac{3}{4}$ mile in extent, the northern end of which is called Guardiola Point. A rocky shoal having 2 feet water on it lies 200 yards from its southern extremity, and at its northern extremity, 400 yards from the shore, is another shoal of 2 feet water. A rock above water, named La Botte du Cap Muro, lies between this latter shoal and the shore. A rocky bank with 6 fathoms water on it lies distant 1 mile from the southern

extremity of the cape. The shore from the cape to Orzo Cove is skirted with rocks. None, however, extend farther than 300 yards off.

The Gulf of Ajaccio, the largest inlet in Corsica, lies between Cape Muro on the south and the Sanguinaires Islets on the north. The gulf is 10 miles deep in an east-northeastward direction. Its southern coast is irregular, forming several bays, separated by projecting points, with off-lying rocks and shoals, none of which extend more than $\frac{3}{4}$ mile from the shore. The north coast is less irregular, but there are also one or two dangers off it. The head of the gulf terminates in a sandy beach, and near it, on the north shore, is the town of Ajaccio. The water in the gulf is very deep, there being 150 fathoms 1 mile off the beach at the head of it. Westerly winds, and particularly those from the southwest, blow with great force and cause a heavy sea, which is felt in nearly every part.

After rounding Cape Muro the projecting points of the coast trend about northeastward to the head of the gulf, forming three bays between, which are about 2 miles deep.

Porto Cacao, a cove 1 mile from Guardiola Point, affords shelter to coasting vessels from southerly winds. A tower stands on the western side of entrance. A rocky bank with $5\frac{1}{2}$ fathoms water on it lies 350 miles 35° from the tower. The coast is skirted at a short distance with rocks.

Castagna Point, 4 miles from Cape Muro, projects to the northwestward, is clifty, and has a tower on it; from the point reefs extend 700 yards to the southwestward. In the bay to the southward of Castagna Point, and to the westward of Chioselle, rocks have been reported extending 400 yards offshore.

Portigliolo Cove, 1 mile eastward of Castagna Point, is, though small, capable of affording shelter to a few coasting vessels from southerly winds, by anchoring near the beach, which is steep-to, in $4\frac{1}{2}$ or $5\frac{1}{2}$ fathoms. A rocky shoal, with $2\frac{1}{4}$ fathoms water on it, lies about 600 yards 299° from the entrance. About $\frac{3}{4}$ mile northeastward of the cove is Piana Islet surrounded with rocks and close to the shore. At $\frac{3}{4}$ mile beyond the islet is a sandy beach through which a river runs into the sea; the coast thence is sinuous, composed of cliffs broken by sandy beaches and skirted here and there by rocks as far as Sette Nave Point.

Sette Nave Point is the termination of a nearly isolated peninsula having a tower named Isolella on its summit; from the point, rocks above water extend nearly 200 yards westward and a rock with a depth of about 3 fathoms on it lies with Isolella Tower bearing 11° 733 yards.

Campania Rock—Beacon.—A dangerous rock named Campania, having only 1 foot water on it, lies 234° from Isolella Tower and $\frac{1}{2}$ mile from the point; a beacon tower 17 feet above high water,

surmounted by a sphere, and painted red and black in horizontal bands has been erected on this danger, between which and Sette Nave Point there is a depth of 7 fathoms with very deep water close outside. To avoid this danger, the tower on Castagna Point must not be brought to the westward 203° until Isolella Tower on Sette Nave Point bears 74° .

Porticcio Point is clifty and foul, with a rock awash about 200 yards to the westward. The intermediate coast forms a bay with a sandy beach, through which a river runs into the sea; the bay is occasionally resorted to by vessels during easterly winds; care should however, be taken to avoid the dangers off the northeastern side of the bay. The d'Orbera is a group of rocks above water, 700 yards 209° from Porticcio Point. There are also several rocks about 600 yards from the shore on the southern side of the bay.

Vescovo Point.—A rock, with a depth of 1 fathom, is situated about $\frac{1}{4}$ mile 226° from this point.

Prunelli and Gravone Rivers.—The shore from Porticcio Point trends eastward, then northward and around northwestward to Aspretto Point, forming a bay $1\frac{1}{4}$ miles deep, and $2\frac{1}{2}$ miles wide between the above points. The shore at the head of this bay is a clear, sandy beach, through which the Prunelli and Gravone Rivers enter the sea. Capitello Tower stands on a little height $1\frac{1}{2}$ miles north-eastward of Porticcio, and at its foot is the mouth of the Prunelli, separating two beaches, the southern being called Viva and the northern Campo dell Oro.

Anchorage.—There is anchorage in front of these beaches, with off-shore winds, in 11 fathoms, sand and mud.

Aspretto.—On Aspretto Point, the eastern point of Ajaccio Bay, are two forts, one on a height and another near its extremity; there is also a lazaretto on the western shore. Several islets or rocks (Les Scoglietti) extend about 700 yards southward of the point, with channels between, through which boats can pass.

Anchorage.—Eastward of the point there is excellent anchorage in from 9 to 15 fathoms, mud, sheltered from nearly all winds, and named Aspretto Anchorage; it is spacious and well adapted for large naval vessels.

Quarantine anchorage.—Aspretto anchorage, eastward of the point, is in from 9 to 15 fathoms, mud, sheltered by Les Scoglietti; the depths decrease suddenly from 6 and 9 fathoms to the shore bank; it is reserved for vessels in strict quarantine.

Radio.—A radio station has been installed on this point; call letters F F A. It lies 400 yards 248° from Fort Aspretto, and the two masts stand in the sea. It is open to the public from 7 a. m. to 10 p. m.

Ajaccio.—The town of Ajaccio stands partly on a low rocky point projecting to the southeastward upon the western side of the bay, and thence along shore to the northward. It contains two or three wide streets, of which the principal is the *cour Napoleon*, a long thoroughfare, with a row of orange trees on each side; the houses are large and lofty, but have no architectural beauty. It has a citadel built in 1554, is the seat of a bishopric, has a royal court and other judicial establishments, a college, a model school, a public library, a good theater and picture gallery, and a fine promenade along the bay. Ajaccio is the capital of the island of Corsica, and the place where Napoleon I was born on August 15, 1769; the house where the event took place is still preserved. Westward of the town are the botanic gardens, Maestrello battery and a Greek chapel. The town is supplied with water by an aqueduct from the Gravone, and drainage works were completed in 1881.

Seamen are received at the Hospital Eugenie, under the control of the municipality.

Population.—In 1911 the population numbered 22,264.

Ajaccio Approach—Fairway reserved for traffic when submarine vessels are exercising.—When the flag with a yellow and a red horizontal stripe is hoisted at the signal stations or on the vessel escorting submarine vessels, to indicate that the latter are exercising submerged, all vessels wishing to enter or leave the port of Ajaccio are earnestly requested to make use of the fairway, defined below, in which submarine vessels are prohibited from exercising submerged.

This fairway is limited as follows:

On the east, by the alignment of Ajaccio Citadel and Mount Rondo, 8,626 feet high, 22 miles 38°.

On the north by the northern coast of the gulf.

The above limits have not been placed on the chart.

Climate, winds, etc.—According to observations made during a period of 25 years, the mean annual height of the barometer at Ajaccio is 29.98; the mean monthly heights in January, the highest, is 30.07, and in April, the lowest, 29.88. The mean annual temperature is 61.6°; the mean monthly temperature in January, the lowest, is 50°, and in August, the highest, 76°.

Rainfall.—The mean annual rainfall at Ajaccio is 22.63 inches. Little rain falls in the four months June to September—only 3.14 inches. The heaviest fall, 3.59 inches, is in October and November, thence to and including April, the average fall is 2.37 inches.

The climate is considered exceedingly good between November and June. The rocky range of the central mountains arrest the north wind and deprive it of its sharpness; the mistral is tamed and almost transformed in crossing a hundred miles of sea. The sirocco is only

an occasional visitor, and its oppressive and irritating heat is relieved by a quantity of moisture absorbed on its journey.

Baie and Port d'Ajaccio.—Baie d'Ajaccio extends northward about 1 mile between Pointe d'Aspretto and a point on which is La Citadelle, about 1 mile west-southwestward. The shore from Pointe d'Aspretto trends northwestward about $\frac{1}{2}$ mile, and rocks and shoal water extend 300 yards off it; a sandy beach then curves westward round the head of the bay to Port des Cannes. There is a conspicuous high chimney near the beach, about 700 yards northward of the lazaretto; the railroad from Ajaccio to Bastia runs along the beach. Castle Vecchio stands on a hill, 121 feet high, about 200 yards within the northwestern corner of the bay, and on the shore about 200 yards southward of it is a house with a white gable among some red and yellow buildings. Five oil tanks are situated on the shore southeastward of the castle. The town is on the western shore of the bay, and Mont Salario, a little over $\frac{1}{2}$ mile to the westward of it, is covered with olives, and there are many mortuary chapels on its slopes. There are depths of from 30 to 63 fathoms in the entrance to the bay, which quickly decrease to 20 fathoms, and thence gradually to 5 fathoms near the head.

Écueil de la Citadelle, a small detached rock, with $1\frac{1}{2}$ fathoms water, lies 500 yards southward of La Citadelle, and shoal water extends from La Citadelle to 100 yards from it. A rock with $1\frac{1}{4}$ fathoms water lies 300 yards northward, and a rock with 2 fathoms water 250 yards westward, of Écueil de la Citadelle. At night, Jetée de Margonaja Light open eastward of Jetée de la Citadelle Light leads eastward of the rocks.

Beacon.—A black masonry beacon, surmounted by a cylinder, 25 feet high, and bearing the word "Citadelle" in white letters, stands on the rock.

Telegraph cable beacons.—A telegraph cable is landed close westward of La Citadelle, where two beacons, painted blue and white in horizontal bands, and surmounted by white disks, in range bearing 25° , indicate its direction. Anchorage is prohibited in the vicinity.

Jetties.—Jetée de la Citadelle extends northeastward 240 yards from the northeastern side of La Citadelle, and it is being extended a further distance of 90 yards north-northeastward. In the middle of the northern side of the jetty is a large discharging quay, with from 16 to 26 feet water alongside, which is protected by a shelter wall, but notwithstanding this, the sea breaks over it in heavy south-westerly weather. The works in progress for extending this jetty are covered by a green sector of Jetée de la Citadelle light and by a red sector of Jetée du Lavoir light.

Jetée du Lavoir extends eastward 230 yards from the shore 600 yards northward of Jetée de la Citadelle. Quai Napoleon is on the

shore between the two jetties, and it has been partly dredged to a depth of 22 feet. The harbor and port offices are on the southern end, and the health office on the northern end of the quay.

Jetée de Margonajo extends eastward about 300 yards in a slight curve from the shore, 600 yards northward of Jetée du Lavoir. A quay extends from the root of the jetty about 600 yards northward to Plage des Cannes. A jetty extends southwestward from the shore in the northeast corner of the bay into $16\frac{1}{2}$ feet water.

Anchorage.—There are three anchorages on the western side of the bay. La Citadelle or Town Anchorage, the southernmost, is off

Capucins Anchorage lies between Jetée du Lavoir and Jetée de Margonajo, in from $3\frac{1}{4}$ to $4\frac{1}{4}$ fathoms. There is good shelter here in ordinary weather, but with strong southwesterly winds in winter the sea becomes heavy southward of La Citadelle, and breaks against the jetty, sometimes even rounding it and breaking against Quai Napoleon; then there is but little shelter except close northward of Jetée de la Citadelle, where vessels are moored with their sterns to the jetty; other vessels have to obtain shelter at Cannes Anchorage.

Capucins Anchorage lies between Jetée du Lavoir and Jetée de Margonajo; here large vessels anchor in about 12 fathoms, mud, and good holding ground, and the sea is much less than at La Citadelle Anchorage during southwesterly winds. This anchorage is reserved for French naval vessels when required; it is covered by the green sector of Jetée de Margonajo Light.

Cannes Anchorage is northward of Jetée de Margonajo in 8 fathoms, mud. It is sheltered from westerly winds, but in very exceptional circumstances a heavy sea is caused by southeasterly winds. It is generally used in winter; the principal part is reserved for French naval vessels. The anchorage is covered by the red sector of Jetée de Margonajo Light.

Prohibited anchorage.—The part of Cannes Anchorage reserved for French naval vessels must not be entered; it lies inside floating booms maintained by four buoys, extending from about 100 yards eastward to 550 yards northeastward of Jetée de Margonajo Light.

Pilotage.—There is a pilot station at Ajaccio limited northward between the Greek Chapel and the cemetery, and southward by Tour d'Isolella. When an entering vessel is not boarded by a pilot until within the limit of the station, but outside Écueil de la Citadelle, one-half the rate is paid; if boarded inside this rock there is no obligatory charge.

There are special rates for naval vessels.

Speed.—The speed of steamers entering or leaving the port must not exceed 10 knots when northward of a line drawn 90° from La Citadelle Lighthouse, to prevent damage to the works in progress at Jetée de la Citadelle.

The town of Ajaccio stands on the low rocky point on which is La Citadelle, and thence northward on the west shore of the bay. It has two or three wide streets, of which the principal is Cour Napoleon, a long thoroughfare, with a row of orange trees on each side. The houses are large and lofty, but have no architectural beauty. It is the seat of a bishopric, has a royal court and other judicial establishments, a college, a model school, a public library, a good theater and picture gallery, and a fine promenade along the bay. La Citadelle was built in 1554. Ajaccio is the capital of the island of Corsica, and Napoleon I was born here on August 15, 1769. The town is supplied with water by an aqueduct from Rivière Gravonne. The population in 1911 was 22,264.

Winds.—North to west winds prevail at Ajaccio throughout the year; in fine summer weather the westerly wind blows in the bay from 10h. a. m. till 5h. p. m., and moderates the temperature, the nights being calm and warm. The sirocco does not often blow.

Buoys.—A black spindle buoy with cylindrical topmark is moored off the end of the works for prolongation of the Citadel Mole, and another is shown off the pier being built out from Lavoir Point.

A sphero-conical buoy painted black with cylindrical topmark, in $3\frac{1}{2}$ fathoms, marks the extremity of the ledge off Fesch College between the first and second anchorage.

Two white buoys, in 5 fathoms water, mark the northeastern and southeastern limits of La Citadelle Anchorage, so that there may be access to Quai Napoleon.

Speed.—In consequence of the works in progress at the moles of the Citadel and Lavoir Point, the speed of steamers approaching the anchorage of Ajaccio or Cannes, must not exceed 10 knots from the time of the Citadel Jetty Light being abeam; the speed of vessels leaving these anchorages must not exceed 10 knots until the above light is abeam.

Patent slip.—See Appendix I.

Telegraph—Beacons.—A submarine telegraph cable is landed close westward of the Citadel, the position being marked by two beacons, painted blue and white in horizontal bands, and surmounted by white circular topmarks. These beacons, when in range bearing 26° , lead close westward of the line of cable.

Rocks.—A rock, with 2 fathoms, and depths of from $2\frac{1}{2}$ to 3 fathoms around, is situated 580 yards 216° from the Citadel Lighthouse.

Rocks with depths of $1\frac{1}{2}$, $1\frac{1}{2}$, and $1\frac{1}{2}$ fathoms are situated, respectively, 240 yards 181° , 280 yards 167° , and 320 yards 196° from Citadel Lighthouse.

Landmarks.—A high chimney of a steam sawmill, situated about 1,350 yards 50° from the extremity of Margonajo Mole is a good mark when coming from the southwestward, and the white gables of small houses painted red and yellow and situated 600 yards 338° from the same point are also conspicuous.

Citadel Rock and Beacon lies rather less than 400 yards southward of the Citadel and formerly had only 7 feet water on it; a black masonry beacon tower, 18 feet high, surmounted by a cylinder, has been erected on the rock. Small vessels may pass inside the rock, but large vessels should keep the lighthouse on Great Sanguinaire Island well open southward of La Botte (Stivale) Rock.

Butticino Rock, another danger requiring caution in approaching Ajaccio, is small, and just above water, with shallow water around it; 200 yards 102° from it there are only 3 feet, and 100 yards 57° 5 feet water. Between the latter depths and 200 yards 74° from the rock is the Guardiola Tower, painted black, surmounted by a cylinder 18 feet above the sea. The rock bears 195° from a Greek Chapel, nearly $\frac{1}{4}$ mile from the shore and $1\frac{1}{4}$ miles westward of the Citadel. The chapel is the most western building on the shore. A rock, with $4\frac{1}{4}$ fathoms on it, is situated 400 yards 216° from Guardiola Tower, and a second with $4\frac{1}{4}$ fathoms over it, is 204° 250 yards from Guardiola Tower.

La Botte (Rocher Stivale) lies 300 yards offshore, southward of the cemetery, and 1,200 yards westward of La Guardiola beacon; it is 13 feet high, but a rock awash lies 200 yards to the southwestward. Rocher Butticino is locally named Botte de la Chapelle des Grecs, and La Botte, Botte du Cimetière.

Lights—Citadel.—From a gray circular turret 40 feet in height, on the north salient angle of Ajaccio Citadel, is exhibited, at an elevation of 62 feet, a flashing group white light, visible 13 miles.

Citadel Jetty.—On the extremity of the Citadel Jetty a fixed red light, with a green sector of 10° , is shown, at an elevation of 45 feet from a gray metal column, 19 feet in height; it is visible 4 miles for the red and $3\frac{1}{2}$ miles for the green. (Unwatched.) (For arc of visibility, see Light List.)

Lavoir Point.—A fixed white light, with red sector, is exhibited from a white metal column, 19 feet in height, situated near the inner end of a new jetty, under construction from Lavoir Point. The white light is visible 8 miles and the red light 4 miles. This light also marks the works in progress for the extension of the Citadel Breakwater. (Unwatched.)

Margonajo Mole.—From a gray metal column, 19 feet in height, on Margonajo Mole, about $\frac{3}{4}$ mile to the north-northeastward of the Citadel, is exhibited, at an elevation of 24 feet, a fixed red light, with

green sector. The red light is visible 4 miles and the green 3 miles. (For sectors, see Light List.) (Unwatched.)

Trade.—The principal imports are coal, building materials, sugar, glass and earthen ware, forage, timber, potatoes, textiles, hardware, wheat, iron, steel, paper and stationery, soap, wine, and spirits; and the exports are timber, charcoal, gallic acid, citrons, bark for tanning, chestnuts, cork, fruit, copper, mineral waters, wine, olive oil, and cheese.

Supplies.—Two or three days' notice is necessary for large quantities of provisions; meat is poor and dear. The water is good, but usually requires filtering. Water may be obtained free from a hydrant on the quay.

Hospital.—Seamen are received at Sainte Eugenie Hospital, which is under the control of the municipality.

Repairs.—There are two machine shops capable of undertaking ordinary repairs.

Patent slip.—See Appendix I.

Communication.—The Fraissinet Line, which carries the mails, has three sailings per week to either Marseille or Nice, besides a coasting service. There is communication twice a week with Nice, also with Marseille, Bonifacio, and Propriano. There is also direct communication between Ajaccio and Bona by the Compagnie Generale Transatlantique. There is a railroad to Ponte Leccia, where it connects with the line between Bastia and Calvi. There is telegraphic communication.

Life-saving station.—A lifeboat is stationed in the port, and there are two rocket apparatuses, one at the customhouse, and the other at the post office.

Wharf.—A wharf of wood and iron has been constructed in the northeastern angle of the bay, which has a depth of about 16½ feet alongside.

Coal.—A coal wharf, 196 feet in length, has a depth of 18 feet alongside; there are no coal merchants, and only sufficient stock is kept for private houses, but the Government stock of coal and patent fuel amounts to 7,500, with space for 10,000 tons.

Parata Point projects to the southwestward and terminates in a hill nearly isolated, on which is a tower; it projects from the elevated land of Mounts Pozzo di Borgo and St. Antoine, and close to its foot is a small islet. The point, in conjunction with the Sanguinaires Islets, forms the north point of the entrance to the Gulf of Ajaccio.

On the eastern side of the point is a beach about 400 yards long with a building on it belonging to a tunny fishery. There is good shelter with winds from the northwestern quarter, in from 5 to 10 fathoms, weeds, southward of the building, about ¼ mile off the beach.

Scudo Point, eastward of Parata Point, is rugged and rocky, with shoal water extending 400 yards to the southward; it is the southern termination of Mount St. Antoine. The intermediate coast is bold and clear of danger with the exception of some rocks which lie close to the land.

The Sanguinaires Islets, a chain of islets and rocks, extend $1\frac{1}{2}$ miles in a southwest direction from Parata Point. The largest and outer, named the Great Sanguinaire, is $\frac{3}{4}$ mile long and about $\frac{1}{4}$ mile broad; it is about 270 feet high, rugged, and terminating in two peaks, the largest and highest being near the northeastern end, having on it a lighthouse and battery. The other peak is at the southwestern end, where there is a tower and semaphore 257 feet above the sea, and in the break between the two there are a lazaretto and chapel. The islet is skirted with rocks, and at the northeastern end, nearly connected to it, is the islet of Cala d'Alga. The rocks extend $\frac{1}{4}$ mile from the southwestern end of the Great Sanguinaire, the outermost having only $\frac{1}{2}$ fathom water on it. A bank, with 6 fathoms of water at its extremity, extends 1,400 yards to the southwestward of the island. From the center of the islet a bluff point, named Tabernacle, projects to the southeastward, and on its northern side is a small rocky cove and landing place.

The passage between the Great Sanguinaire and Parata Point is obstructed by smaller islets and rocks; the largest of these, named Porre, is next to the point; and the whole are known as the Little Sanguinaires. The channel formed by Porre Islet and Parata Point is $\frac{1}{4}$ mile wide and carries midway not less than 23 feet water.

Light.—From a square tower 52 feet in height, with basement on the highest part of the Great Sanguinaire, is exhibited at 322 feet above the sea, a group flashing white light visible 24 miles. (See Light List.

Tabernacle Rock—Buoy.—This danger is of small extent, with 9 feet water on it, and bears 141° from Sanguinaire Lighthouse, distant 1,300 yards from Tabernacle Point. From the rock, Botte Islet (southward of Cape Feno) is in line with the western end of the islet next westward of Porre, and the eastern angle of Ajaccio Citadel is open southward of the Greek chapel; a black spindle buoy with cylindrical topmark, is moored close to the southward of the rock.

Another rock, with 3 fathoms on it, lies about 153° rather more than 400 yards from Tabernacle Point.

There is also a rocky bank about 400 yards in extent, with 10 fathoms on it, lying 226° from the lighthouse, distant about $1\frac{1}{4}$ miles from the islet; the sea breaks on it in bad weather.

Directions.—The entrance to the Gulf of Ajaccio will be known at a distance by Mounts Lisa and St. Antoine, the former being to

the northward of the latter, higher and conical, and commands Cape Feno and the Sanguinaires Islets. On a nearer approach the islets and lighthouse will be seen and finally the town of Ajaccio on a low point. In the absence of the Tabernacle Buoy, the rock will be cleared by having the outer part of the citadel well open southward of the Greek chapel bearing 63° . To avoid the Citadel Rock at night, keep the red light on the Margonajo Mole open of the green light on the Citadel Mole.

Cape Feno, $4\frac{1}{2}$ miles northward of Parata Point, is high, rugged, and has a tower on it; at its foot are some rocks extending a short distance off. The intermediate coast is irregular, forming Minaccia Bay, with a sandy beach at its head, where there is anchorage for coasting vessels with offshore winds.

A rocky patch, with a depth of 5 feet over it, lies in Minaccia Bay, with la Botte Islet bearing 296° , distant 1.4 miles, and the pyramid on Corba Point bearing 193° .

La Botte, a small islet, only of just sufficient height to be seen, and having sunken rocks close around it, lies 1.3 miles 186° from Cape Feno. Between the two there is a rock with 6 feet water on it, lying about 700 yards offshore. The islet is $\frac{3}{4}$ mile from the coast, and in the channel between there are from 9 to 18 fathoms water. This part of the coast is skirted with rocks, which at $1\frac{1}{4}$ miles northward of Parata Point extend off about 400 yards.

Gulf of Sagone.—The coast between Cape Feno and Cargese Point forms a large and deep bay (Sagone Gulf), which contains several smaller bays with beaches and anchorages with offshore winds; it is open to the westward and as the winds from this quarter blow with much force, a heavy sea reaches all the anchorages. The gulf is 7 miles deep, and the shores which are sinuous fall back to the Bay of Liscia at its head. Several rivers flow into the gulf, the principal being the Sagone and the Liamone.

Lava Bay.—From Cape Feno a cliffy coast trends eastward to Pietra Rossa Point, distant $1\frac{1}{2}$ miles; thence short sandy beaches trend round north and west to Pelusetta Point, $3\frac{1}{2}$ miles from the cape; a rock 1 foot high lies 300 yards from the point. The indentation between the two extremities is named Lava Bay. About 700 yards from the land is the small islet of Piombata surrounded by rocks; between it and the coast there are from $3\frac{1}{4}$ to $5\frac{1}{2}$ fathoms water. Figiera Islet, also surrounded with rocks and banks, lies just eastward of Pietra Rossa Point.

Port Provencale, in the northeast corner of the bay, where there is a sandy beach $\frac{1}{2}$ mile in length north and south, has off it anchorage with land winds in from 6 to 10 fathoms, sand and mud, 400 yards from the shore; the Lava River here runs into the sea.

Liscia Bay.—Parragiola Point and islet lie about $\frac{1}{2}$ mile to the north-northwestward of Pelusetta Point, the coast between being high and cliffy. From this point the rugged shore, which is fringed with rocks, trends to the northeastward to Castellaccio Point, distant $1\frac{1}{2}$ miles. At 2.6 miles farther on is Palmentojo Point, with large rocks projecting from it 400 yards and shoal water 600 yards to the westward; 1.3 miles northward of it is Locco Point, the extremity of an islet nearly connected to the shore and also surrounded by rocks. These two latter points have towers on them and form the entrance to Liscia Bay, which is somewhat more than 1 mile deep, open to westward, and its shores strewn with rocks.

Paliagi Reef.—This dangerous reef, 700 yards in extent, lies 700 yards from the shore between Castellaccio and Palmentojo Points; between it and the shore is a depth of 12 fathoms. The shallowest part of the reef, where there is 3 feet water, lies 265° from Palmentojo Tower and northeastward of Castellaccio Point.

St. Joseph Point.—At $1\frac{1}{2}$ miles northward of Locca Point is St. Joseph Point, projecting to the southwestward, and terminating in an islet. The shore between the two points is a clean beach, and midway between them the Liamone River, which can be entered by boats, flows into the sea.

St. Joseph Reef, about $\frac{1}{2}$ mile 237° from St. Joseph Point, is a rock about 3 feet above water, surrounded by others with more or less water on them, the whole extending about 800 yards in a northeast and southwest direction; in bad weather the sea breaks on it. There are $6\frac{1}{2}$ fathoms water between the reef and the point.

Anchorage.—There is anchorage with winds from northwest around by north to southeast, southward of the Liamone River, 400 or 600 yards from the shore. Small vessels may pass midway between the reef and the rocks off St. Joseph Point.

Sagone Bay.—Nearly $1\frac{1}{4}$ miles 321° from St. Joseph Point is a small fort or battery on a rocky point; the shore between forms Sagone Bay with a beach, through which the river of the same name enters the sea.

A pier has been constructed at Sagone, on which and in the rocks to the westward are bollards for convenience in mooring small vessels in fine weather.

Anchorage.—Between the battery and mouth of the river is a tower on the cliffs, and about 400 yards 125° from the tower temporary anchorage may be had in 8 or 9 fathoms, sand and weeds; small vessels moor farther in, with anchors seaward and sterns secured to the shore. With strong northeasterly winds heavy squalls are experienced from the high land, and the whole bay is exposed to the full force of the southwest winds and sea.

Directions.—Vessels bound to Sagone Anchorage should give a sufficient berth to St. Joseph Reef; pass more than $\frac{3}{4}$ mile from Puntiglione Point and $\frac{1}{2}$ mile from the battery.

Life-saving stations.—There is life-saving apparatus at Sagone and Cargese.

Puntiglione Reef.—From the battery the shore trends about 1 mile in a 254° direction to Puntiglione Point, which is rugged, rocky, and overlooked by high land. From it a reef extends about 1,400 yards in a southwest direction, with $5\frac{1}{2}$ fathoms on its extremity; the sea breaks on it with on-shore winds.

Cargese Point.—From Puntiglione Point the coast is rugged, in places fringed with rock, sinuous and trends to the northwest as far as Cargese Point. The point is steep, rather low, and has a tower on it; behind it at the base of some hills is the town of the same name. A rock awash lies a short distance from the point.

Marifaja Rock.—About $\frac{1}{2}$ mile offshore is Marifaja Rock, about 4 feet high, with shallow water on its eastern side. It lies 1.8 miles 119° from Cargese Point and 293° from Puntiglione Point; between the rock and the coast there are depths of from 7 to 15 fathoms.

Pero Bay.—About $1\frac{1}{2}$ miles 316° from Cargese Point is Omignia Point, the termination of a tongue of steep land $1\frac{1}{4}$ miles in length projecting to the southwestward; a tower stands on the point. The coast between forms Pero Bay, with a small sandy beach at its head, and the river of the same name runs into it. It is exposed to the southwest, and at the foot of the point there are some rocks.

Chioni Bay.—On the northern side of Omignia Point is Chioni Bay, $1\frac{1}{2}$ miles deep and about $1\frac{1}{2}$ miles wide at the entrance, narrowing to $\frac{1}{2}$ mile at the head, where there is a sandy beach; the river of the same name runs into it. About $\frac{1}{2}$ mile eastward of Orchino Point, the northern point of the bay, is a round hill with a tower on it. A short distance inland from the head of the bay is the village of Lozzi, and another named Malzone 1 mile northward of it. A round islet surrounded by rocks lies a short distance from the cliffs of Orchino Point.

Cape Rosso, a rocky precipitous bluff 1,122 feet high, takes its name from the red color of its cliffs; the land forming it is a high, broken, and nearly isolated mass, with a tower on its summit. Two islets of a reddish color lie at the foot of the cape and another, called Black Rock, close to the land about $\frac{1}{2}$ mile to the southeastward. The coast between Orchino and Rosso Points forms several bays and coves which are useful to fishing boats. The Sologna River disembogues in Arone Bay, midway between the two points; from Tuselli Point, which projects $\frac{3}{4}$ mile to the westward, a reef extends 400 yards in the same direction.

Gulf of Porto.—At $5\frac{1}{2}$ miles 6° from Cape Rosso is Rossa Point, forming the northern extremity of the entrance to Porto Gulf, which is $6\frac{1}{2}$ miles deep. The gulf is open to the westward, and there are no anchorages. The south coast is cliffy and runs nearly straight in an easterly direction to a small sandy beach at the head of the gulf, where the Porto River enters the sea; the towns of Vistale and Piana are to be seen on the southern side of the gulf. From the mouth of the river the coast is irregular and trends to the northward and northwestward to Cape Cenino, distant 5 miles; the mount of this name is immediately over the cape, and the land has a red appearance. The water in the gulf is exceedingly deep; several rocks above water lie a short distance from the southern shore; one with 18 feet water on it lies 400 yards northward of Vardiola Point and $1\frac{1}{4}$ miles from Cape Rosso, and one with 6 feet water on it lies 400 yards westward of Piana Point.

Castagna Cove.—Small vessels during the summer can obtain sheltered anchorage in depths of from 9 to 14 fathoms; good holding ground, in this cove, situated about $\frac{3}{4}$ mile westward of Porto.

There is room for three small vessels with their sterns secured to bollards on the rocks.

During easterly winds similar accommodation can be found on the western side of Capicciolo Point.

Landing at Porto is difficult when there is a swell.

Life-saving station.—There is a life-saving apparatus at Piana.

Girolata Gulf, between Cape Cenino and Rossa Point, is $1\frac{1}{4}$ miles wide at the entrance and 2 miles deep; it is surrounded by elevated land; there are upward of 100 fathoms water in the center and from 15 to 20 fathoms 100 yards from the coast.

The shore from Cape Cenino trends northeastward, and is steep rocky cliffs as far as the north foot of Mont Castellaccio, 1,089 feet high, where it turns northward with more accessible slopes. There is a little beach in Anse de Trara (Tuara), where landing can be effected in fine weather, and the track between Osani and Girolata reached.

Port Girolata, in the middle of the head of the gulf, is eastward of a small peninsula projecting from the northern side of a little bight; on the peninsula is a gray fort, within which is an old tower and some houses. The port, which is about 200 yards in length, is only accessible to boats, for the bottom is strewn with large stones thrown overboard from vessels after serving as ballast.

There is anchorage in about 10 fathoms 200 yards southward of the fort, but it is open to the westward.

The shore between Girolata and Point Rossa is rocky, and the few small beaches are at the base of cliffs, and do not afford landing.

The cliffs from about 1 mile northwestward of Girolata to Point Rossa are dark red granite, and from 650 to 980 feet high.

Caution.—When navigating in Gulf of Porto or that of Girolata, pay attention to the weather so as not to be caught by westerly winds, which are indicated, a little in advance of their arrival, by flaky clouds appearing on Cape Rosso toward the evening or morning on the opposite side of the cape to the direction the wind will come from; that is, northeast, east, or southeast of the cape, according as the wind will come from southwest, west, or northwest. When Luccio forest, on the ridge to the northeastward of Girolata, is covered by white clouds, westerly winds may be expected. The setting in of a swell is also an indication, but generally it precedes the wind by a very short time.

Rossa Point is a high red cliff, projects to the southwestward, and is the termination of very high land. Two sunken rocks and others above water lie about 150 yards from the foot of the point.

Gargalo Island, 2 miles northward of Rossa Point, is nearly $\frac{1}{2}$ mile in extent, 417 feet high, rugged and black colored; on its summit is a tower. It is only separated from the coast by a channel about 50 yards wide, in which are scattered rocks; at its southern end is an islet and close to its northern end is a remarkable high red rock; it is steep-to.

Palazzo Point.—At about 1,400 yards to the northeastward of Gargalo Island is Palazzo Point, projecting to the northward, and having close to its foot two islets.

Focolara Bay.—Three miles 62° from Palazzo Point is Validori Point, with high land above it. The intermediate coast forms several bays; the largest, Focolara, is open to the northward and westward. There are several small islets and rocks along the shore; the largest and outermost, named Pori, is 400 yards 304° from Scandola Point and midway between Palazzo and Validori Points.

Scoglietti Rocks are a group of rocks about 600 yards from the coast; small vessels can pass between them and the shore. A short distance 338° from these rocks is a rocky bank with 5 fathoms water on it; between the two there are 14 fathoms.

Gulf of Galeria.—Three-fourths of a mile eastward of the Scoglietti Rocks is Stollo Point, the coast between being fringed with rocks. The Gulf of Galeria, formed between the latter point and Ciuttone Point, is 1.3 miles deep and at its head is a sandy beach; Fango River runs into it, and on the southern side of its mouth is Galeria Tower. About $11\frac{1}{2}$ miles southward of the tower, at the entrance of the river, is the elevated peak of Mount Tondo. In the southern corner of the gulf is a bay with a sandy beach, where small coasting vessels anchor in from 14 to 17 feet water, to load with

charcoal. The western shore of this bay is composed of cliffs, which extend 250° yards to the northeastward of Fontana Point and then turn to the westward as far as Stollo Point; they are skirted with rocks.

Danger Rock.—A rocky bank, with 6 feet water on it, lies at the entrance of the bay, 500 yards from the southern shore and 77° 300 yards from Fontana Point.

Anchorage.—Large vessels in fine weather, or with offshore winds, may anchor about 700 yards to the northwestward of the tower, in from 18 to 12 fathoms, sand and mud; they are, however, exposed to westerly winds.

Ciuttone Point is rounded and the termination of a spur projecting about $\frac{3}{4}$ mile into the sea from the elevated land behind it, separating the Gulf of Galeria from Crovani Bay.

Cape Morsetta is a mass of high steep rock, with an islet on its western face and another at its southern extremity, both close-to. From Ciuttone Point, the intermediate land forms Crovani Bay, which is more than 1 mile deep, with a clear sandy beach at its head, where a small river enters the sea. There is anchorage here for coasting vessels with offshore winds, in 8 to 10 fathoms. On the slope of the hill behind the village of l'Argentelle are lead mines and smelting works.

Cape Cavallo, about 2.6 miles 23° from Cape Morsetta, has a semaphore signal station on it, at which the International Code is used; the intervening coast is high, rugged, and steep-to, and nearly midway, on the tableland which it forms, is the tower of Truccia.

Nichiareto Bay.—From Cape Cavallo the coast trends eastward $2\frac{1}{2}$ miles to the northern point of the small bay of Nichiareto, when it assumes a northerly direction, forming several points and bays, to Bianca Point, distant nearly 4 miles 29° from the cape. There is a small beach in Nichiareto Bay, but the rest of the coast is irregular and rocky, with islets or rocks here and there near the shore. A rocky shoal of 4 fathoms water lies 600 yards from the shore, $1\frac{1}{2}$ miles 54° from Cape Cavallo.

Revellata Point.—From Bianca Point the coast, with a slight indentation trends to the northeastward to Revellata Point. This latter point, which is high and projects to the northward, has an islet close to it and forms the western extremity of the Gulf of Calvi.

Light.—From a square tower 52 feet in height, with a basement, on the extremity of Revellata Point, is exhibited, at an elevation of 289 feet, a group flashing white light. It is visible 24 miles, except when obscured by the land. (See Light List.)

Life-saving station.—There is a life-saving apparatus at Revellata Lighthouse.

Gulf of Calvi.—At $3\frac{1}{2}$ miles 76° from Revellata Point is Espano Point. The intermediate coast forms a bay extending $2\frac{1}{2}$ miles to the southeastward, with an extensive beach at its head. It is divided by the steep point of San Francesco and the town of Calvi into two parts, that to the westward being known as Revellata Bay, and the whole as the Gulf of Calvi. It is surrounded by elevated land, Mount Grosso, 8 miles southeastward of the town, being seen in clear weather from a distance of 75 miles. Revellata Bay is clear of danger and affords shelter against winds from north-northwest round by south to east-southeast. There are from 8 to 10 fathoms, sand and weeds, about $\frac{1}{4}$ mile from the head of the bay. There is a natural landing place in the bight on the southern side of Pointe Ossellucia (Oscellucia.)

A rocky point projects eastward from the coastline about 400 yards southeastward of Pointe San Francesco, and on it is the citadel; it is covered with fig trees. Pointe San Francesco is surmounted by a remarkable escarpment. Immediately southward of the town a sand beach commences and extends round the head of the gulf to the mouth of Fiume Secco, when it becomes rocky and a little broken to Pointe Caldano. The land within the beach is low and marshy, and the 5-fathom curve is about 600 yards from the beach. It is surrounded by high land, Mont Grosso, 7 miles to the southeastward, being 6,368 feet high.

Port.—The quay of the port is in front of the low town, and large stone steps facilitate landing. A jetty, 228 feet long, extends southeastward from the citadel, and affords shelter to boats.

Buoys.—Two mooring buoys have been placed in the port for the use of the mail steamers.

Calvi.—There are two towns at Calvi—the high town inclosed within the walls of the citadel contains most of the Government buildings, which are now falling into ruins, and the low town, to the southward, which is progressing slowly. Each has its church. The spire of the low town church is slender, and the belfry of the high town church is a square tower, which rises near the dome at the summit of the citadel. The population is about 2,000.

Supplies.—Provisions can be obtained. Water can be procured from two pipes, one in the middle and the other at the end of the jetty, on application to the harbor master.

Communication.—A railroad extends from Calvi to Ile Rousse, and thence via Ponte Leccia, where it connects with the line to Ajaccio and Casainozza, to Basia and Ghionaccia.

Life-saving station.—There is a life-saving apparatus at Calvi.

Anchorage.—The anchorage is southeastward of the citadel in 7 or 8 fathoms, sand and weeds, good holding ground. Small vessels anchor farther in and secure to the shore.

A rocky bank, on which is a depth of 8 fathoms, lies just eastward of the anchorage, 600 yards from the cliffs of the town, which vessels should avoid when anchoring.

Lights.—From a yellow iron shed situated at the foot of the citadel of Calvi, at an elevation of 97 feet above the sea, a fixed white light is exhibited, visible 8 miles.

From a green metal post at the pierhead, at an elevation of 33 feet above the sea, is exhibited a fixed green light, visible 4 miles. (Unwatched.) (See Light List.)

Caldano Point.—About $1\frac{1}{2}$ miles 63° from Calvi Light is Caldano Point, with a tower on it, surrounded with rocks which extend off nearly 300 yards; the bay between is about 1 mile in depth with several streams falling into it. To the southward of the point, and at the termination of Calvi Beach, is Pietra Mala, a round islet or rock, close to the shore. Between Calvi and Caldano Point are depths of from 18 to 23 fathoms, sand and weeds.

Espano Point.—The northeastern extremity of the Gulf of Calvi is low, projects to the west, and has a fortified tower on its north part. An islet lies 300 yards from the point, with other small islets or rocks around it; they are steep-to but should not be approached too closely.

Algajola Bay.—From Espano Point the coast trends eastward, backed by elevated land, to St. Damiano Point, distant $2\frac{1}{2}$ miles; between is a bay extending southward, but of no use to the navigator.

Point Sant' Ambrogio is about 1 mile eastward of Espano Point, and midway between, a little inland, are two large rocks, which resemble an elephant in shape.

On the eastern side of St. Damiano Point is the cove of the same name; partially sheltered from northerly winds by a jetty, used by coasting vessels with offshore winds; and on the shore about $\frac{1}{2}$ mile to the east-southeastward of the point is the town of Algajola with a clean sandy beach extending about 1 mile beyond it. The anchorage off the town is exposed to northerly winds and is only used by coasting vessels in fine weather. An islet, 6 feet high, with a rock awash outside it, lies about 400 yards from the coast between St. Damiano Point and Algajola.

Algajola Rocks.—At 1.4 miles 316° from the town of Algajola is the center of dangerous rocky patches of the same name, about 500 yards long, north and south, and 500 yards wide, with only 1 foot water on the shallowest part; there are from 6 to 8 fathoms around them. The center lies about $5\frac{1}{2}$ miles 65° from Revellata Lighthouse and 1 mile 327° from St. Damiano Point. Between these patches and the latter point there are from 14 to 18 fathoms water. To pass westward of them keep the town of Calvi open westward of

the Espano Islets. To pass between them and the land bring Revelata Lighthouse just open of Espano Islets.

Beacon.—An iron beacon 15 feet above the sea, painted with red and black horizontal bands alternately, and surmounted by a ball, has been erected near the center of Algajola Rocks, but is said to be difficult to distinguish.

Vallitone Point.—Nearly $1\frac{1}{2}$ miles 40° from Algajola is Vallitone Point, rugged and surrounded with rocks, which extend 200 yards northward; the intervening coasts form three small bays with beaches. .

Durance Rock.—This danger (on which the Fraissinet Co.'s steamer *Durance* was wrecked in February 1880) has 3 feet water over it and lies with the western extremity of Vallitone Point bearing 216° , distant 400 yards. A rock with one foot over it lies 100 yards 216° from Durance Rock.

Ile Rousse.—At $2\frac{1}{2}$ miles eastward of Vallitone Point are the Rousse Islets, one of which is large and the remaining three small, with several rocks around them. On the eastern end of the largest islet (Pietra), which is 700 yards long in a northwest and southeast direction, there is a tower and a battery.

Pietra is connected by a jetty with the other islet (Sicota) and a stone bridge connects the latter with the mainland, forming a small port which affords shelter from westerly winds.

A high mole also extends 200 yards 130° from the southeastern end of Pietra.

Buoys.—A mooring buoy lies about 150 yards southeastward of the high mole; it is used for maneuvering the mail steamers, and affords no security for mooring. There are two mooring buoys in the port.

Slipway.—A small slipway is situated on the southwestern side of Sicota Island and forms a good boat landing with offshore winds.

Rousse Rock, about 250 yards 40° from the smallest and outer islet, has $3\frac{1}{2}$ fathoms of water on it. Mount Orcica, just over the end of the mole 167° , leads clear to the eastward.

Naso Bank, with 8 fathoms of water on it and 13 and 19 fathoms round it, lies 1,200 yards 74° from the same islet.

The town of Ile Rousse is situated on a tongue of land 400 yards eastward of the bridge connecting the mainland to the islands and is a place of some commercial importance. The country around is rich in various fruits, an export trade of which, and oil and pine wood, is carried on with Marseille and neighboring ports. A short mole projects to the eastward, northward of the town, and there is a battery on the shore a little beyond; on both sides of the town is a sandy beach. Population is about 1,900.

Communication.—The town is on the railroad between Calvi, and Ponte Leccia, the junction with the lines to Bastia, Ghisonnaccia, and Ajaccio. There is railroad communication to Bastia and Calvi and steamers call here between Marseille and Bastia.

There is a fortnightly service with Marseille, Nice, and Toulon. There is also telegraphic communication.

Lights.—On the summit of the largest of the Rousse group (Pietra) is a square turret on building which exhibits, at 180 feet above the sea, a group occulting light, with red sector. It is visible 19 miles for the white and 15 miles for the red. It shows red over the shoal northward of Point Vallitone and Algajola Rocks and white in other directions. (For limits of sector see Light List and chart.)

A fixed green light is shown from a masonry turret 15 feet in height on the mole head northward of the town of Ile Rousse; it is visible 10 miles.

Semaphore.—There is a semaphore signal station 497 feet above the sea, on an isolated hillock $\frac{3}{4}$ mile 212° , from the lighthouse; communication can be made by the International Code.

Anchorage.—The mail steamers berth alongside the mole, the outer part of which is reserved for them. Other vessels anchor southward of the mole, and haul their sterns to about 30 feet from it, lying head to the south-southwestward. The port is reserved for vessels of moderate size, and large vessels anchor, in about 11 fathoms water, about 400 yards eastward of the mole lighthouse, but must leave should northerly or northeasterly winds set in.

The Rousse Islets, in conjunction with the coast, affords excellent shelter for all classes of vessels with winds from northwest around by south to southeast. The anchorage is in about 8 fathoms (sand and mud), halfway between the eastern point of the islands and the town. This anchorage should, however, be abandoned in the event of northerly or northeasterly winds.

Life-saving station.—There is a life-saving apparatus at Ile Rousse customhouse.

Supplies can readily be obtained. Water can be procured from a fountain on the shore near the inner end of the high mole, or better from a pipe on the small mole near the north end of the town.

Coal.—There is a Government stock of 400 tons of patent fuel, but no coal for sale.

The coast.—From the town of Ile Rousse the coast trends eastward and gradually around to north as far as Alciolo Point; it is low, backed by elevated lands, and forms a bend to the southeastward, with one or two small sandy bays. Two rivers enter the sea, the Regino, $3\frac{1}{4}$ miles from Ile Rousse, and the Ostriconi, 2 miles southward of the point. The Ostriconi disembogues in the bay of

the same name, called also *Marina de Porajola*, on one side of which there is a remarkable white patch, while on the southwest is the *Cime al Arca*, a long, green mount of some elevation. *Alciolo Point* is low, rocky, and projects to the north-northwestward, and a short distance inshore is *Mount Orlando*, with three small elevations.

To the northeastward of *Alciolo Point* the coast is higher and rugged, backed by high, mountainous land, on the slopes of which are numerous towns and villages.

From *Alciolo Point* the coast curves slightly outward to the northeastward to *Mignale Point*, a distance of $5\frac{1}{2}$ miles, thence it trends eastward and southeastward 4 miles to *Mortella Point*. This part of the coast is irregular and rugged, with several points; the most projecting are named *Solche*, *Mignale*, and *Perallo*. It is fringed here and there with rocks at a short distance from the shore; the *Lenti River* flows into the sandy bay westward of *Perallo Point*, and eastward of it, fronted by a similar beach, is *Lake Loto*. *Port Malfalco*, $3\frac{1}{2}$ miles from *Alciolo Point*, is a small inlet, extending about 450 yards southward, having from 12 to 7 feet water, and affording shelter to coasting vessels with offshore winds. There is also anchorage, with southerly winds, off the beach of *Padulella*, westward of *Perallo Point*, called also *Marina de Fecajo*.

Mortella Point is low, rugged, and surrounded by rocks, and forms the western point of entrance to the Gulf of St. Florent; about 350 yards southward of it on a projecting point is a tower in ruins.

Light.—From a white masonry turret on main building 44 feet high, situated on *Mortella Point* is exhibited at an elevation of 140 feet above the sea, an occulting white light, visible 16 miles. (See *Light List*.)

Signal station.—There is a semaphore 67 feet high and 262 feet above high water on *Mortella Point*, where the International Code is used. Closed until further notice (1914.)

Anchorage.—About 700 yards southward of the tower, and about $\frac{1}{2}$ mile from the shore, is the anchorage of *Mortella*, which affords excellent shelter from southwest winds, in from 9 to 11 fathoms, mud and weed.

Life-saving station.—There is a life-saving apparatus at *Mortella Point Lighthouse*.

Gulf of St. Florent, the entrance to which is 3 miles broad between *Mortella Point* and the point and tower of *Vecchiaja*, is $2\frac{1}{2}$ miles deep. The head of the gulf and part of the eastern shore is sandy, and several streams enter the gulf on both sides; the largest, named *Nebi*, passing through the sandy beach at the head.

Fornali Cove, a small inlet convenient for fishing boats, lies 3 miles southward of *Mortella Point*; over its southern point is a tower. A

rock awash lies in the middle, and the depth of water diminishes rapidly to the head of the port, 250 yards to the southwestward, where a small stream disembogues. Between this cove and Mortella Point is another point projecting to the northeastward, with a battery on it and surrounded with rocks.

St. Florent Anchorage.—Small vessels anchor in from 3 to 3½ fathoms about 200 yards southward of La Tegnosa Beacon, but the holding ground is bad, and the sea heavy with northerly winds. In approaching this anchorage pass westward of La Tegnosa.

Pilotage.—There is a pilot station at St. Florent; its northern limits are Pointe Perallo and Plage de Negro.

Sailing merchant vessels pay on entry and departure. There are special rates for naval vessels.

Town.—The town of St. Florent is situated on a point 1 mile east-southeastward of Pointe de Fornali, and immediately northward of the mouth of L'Aliso.

The citadel, on a little hill northeastward of the town, is surrounded by bastions.

There is a quay on the southwest side of the town and two small moles extend about 20 yards off it; one serves as a breakwater, and boats go alongside the other.

Supplies.—Usually provisions are not abundant, but they could be obtained if notice was given in advance. Water can be procured at the town quays.

Communication.—There are roads to Île Rousse, Nonza, and Bastia; there is telegraphic communication.

Lifeboat.—There is a lifeboat and life-saving apparatus at St. Florent customhouse.

Telegraph cable beacons.—A submarine cable is landed at the head of this gulf in a position marked by two beacons, painted white and blue in horizontal bands, surmounted by white circular topmarks.

These beacons, when in range bearing 191°, lead close westward of the line of cable.

Beacon—Tegnosa Rock, with a rock awash, lies westward of the town, and is marked by a black beacon tower, 17 feet high, surmounted by a cylinder. The head of the gulf is shallow.

The anchorage.—Large vessels anchor in from 7½ to 9 fathoms, weed, with the tower bearing about ¼ mile 260° from the shore; small vessels go farther in. The only inconvenience at this anchorage with northerly winds is the sea thrown in from that direction; the wind, however, rarely blows home, being repelled by the surrounding high land. The town should not be approached nearer than about 700 yards.

At the head of the gulf there are some dark-looking hills which from the low, marshy land around them appear at a distance like islands. On a near approach the town of St. Florent and Fornali Tower will be seen. In the middle of the gulf, between Mortella and Vecchiaja Towers, there are from 28 to 35 fathoms, mud, diminishing gradually to $3\frac{1}{2}$ fathoms at 700 yards northward of the town, whence it shoals rapidly to the beach. From the town the eastern coast of the gulf trends to the northeastward and northward, the first part being a sandy beach bordered by shallow water; thence to Vecchiaja Point it is rugged and fringed with a few rocks.

Light.—From a square white tower on Fornali Point, at an elevation of 46 feet above the sea, a fixed green light is exhibited which is visible 5 miles. (See Light List.)

Vecchiaja Point, the eastern extremity of the entrance to the Gulf of St. Florent, has a pyramid on it; it is bold and steep-to and the beginning of a high, rugged coast. On the heights are several towns and villages.

Canelles Point, $7\frac{1}{4}$ miles northward of Vecchiaja Point, is high and steep, with rocks at its foot. The intermediate coast is high but broken by small sandy beaches, approachable only by small coasting vessels in fine weather. These beaches are mostly defended by towers and are respectively named Farinole, Negro, Nonza, and Albo, and the houses adjoining serve as points of communication with the towns in the mountains. The coast is bold and steep, except a rock here and there near the shore; the most dangerous lies about $\frac{1}{2}$ mile northward of the point and abreast a stream from the village of Canari; the rock is awash and is 500 yards from the shore.

Life-saving station.—There is a life-saving station at Nonza.

Minervio Point.—Cape Bianco, the northwestern extremity of the island of Corsica, derives its name from the white color of the land which forms it. Minervio Point, 3.6 miles northward of Canelles Point, is high and terminates in a peak, the intermediate coast forming an indentation with a small beach on which are a few houses and Giotta Tower: close to the foot of Minervio Point is a small islet or rock.

Aliso Bay.—Nearly $2\frac{1}{4}$ miles to the northeastward of Minervio Point is the small bay and beach of Aliso, open to the westward, and fit only for coasting vessels during land winds. On the southern extremity of the bay, which is low, is a tower and the town of Pino.

Port Centuri.—At $1\frac{1}{4}$ miles southward of Cape Bianco is the small island of Centuri, of moderate height, with the ruins of a tower on its southwestern part; it is about 200 yards from the coast and the passage between is choked with rocks. A shoal with only 3 feet water on it lies 200 yards northward of the island.

A small cove, in the middle of the bight formed by the coast in conjunction with Centuri Island, is named Port Centuri. The bight is open to the northwestward, but the cove, though small, shelters vessels of 5 and 6 feet draft; the town is built round the shore of the cove, and on the north side of the entrance is a beacon tower in ruins. Large vessels find temporary anchorage with offshore winds to the northwestward of the mouth of the cove in 7 or 8 fathoms, sand.

Rock.—A rock, with $1\frac{1}{2}$ fathoms water, is situated 100 yards northeastward of the islet in the middle of Marine de Morsiglia, southward of Centuri Island.

Beacon.—A metal beacon, painted black and surmounted by a cylindrical topmark, is erected on Teja Shoal.

Life-saving station.—There is a life-saving apparatus at Port Centuri.

Centuri Bank.—On the parallel of and $2\frac{1}{2}$ miles 260° from Cape Bianco is a small rocky bank called Centuri. It has 8 fathoms water on it, 16 to 27 fathoms close around, and between it and the coast 32 fathoms. When the sea is heavy vessels should give the bank a wide berth.

The coast between the Gulf of St. Florent and Cape Bianco is generally clifty, bold, and steep-to, and in direction runs nearly parallel with the east coast between Bastia and the islets of Finocchiarola. The two shores alluded to form the east and west outline of the remarkable promontory extending 20 miles in a northerly direction from the main body of the island, with a breadth varying from 5 to 8 miles. The shape of this notable ridge of land has been compared to the head of a tortoise, to which animal the outline of the whole island bears some fanciful resemblance. Several towns are to be seen on the western slopes of the elevated chain of mountains which form the above arm, the most remarkable being Centuri, Morsiglia, Pino, Canari, and Ogliastro; steep and winding roads cross the mountains in various directions.

Life-saving stations.—There are life-saving stations at Canari and Pino.

TUSCAN ARCHIPELAGO.

The Tuscan Archipelago belongs to the Kingdom of Italy, and consists of eight islands and two groups of rocks, with deep and safe channels between them; they are situated between the northern part of Corsica and the west coast of Italy. The group forms the figure of a parallelogram, the western side of which comprises the islands of Capraia, Pianosa, and Monte Cristo, and the Africa Rock; the channel between them and Corsica is from 15 to 22 miles wide; the eastern side comprises the islands of Elba, Palamajola, Cerboli, Giglio, and Giannutri, and the Formiche de Grosseto Rocks, all being 5 to 8 miles distant from the coast of Italy.

Capraia or Capraja (ancient *Ægilon*), a volcanic island lying $16\frac{1}{2}$ miles 88° from Cape Corso, is $4\frac{1}{2}$ miles long south-southwest and north-northeast, with an average breadth of 2 miles, and is the most northern of the islands composing the archipelago. A high ridge extends the whole length of the island along its western side, the highest peak of which, Mount Castello, is 1,467 feet in height. The coast is bold and cliffy and is steep-to except at the northern end, off which are a few rocks above water; 10 fathoms will be found within 200 yards of the shore in all other directions, over a bottom of sand and gravel.

Capraia town is situated on Punta Ferrajone, on the northeast side of the island, and on the eastern side of a bay $\frac{1}{4}$ mile in extent, at the head of which, and within a mole, is a secure port, with a depth of about 11 feet, for small craft. The town has a convent, two chapels, and several houses. About $\frac{1}{4}$ mile southward of the point is a fort, 299 feet above high water, on the dark bastions of which is a yellow building surmounted by a slender cylindrical column. There is a penal settlement here with some 500 convicts, and there is also a population of about 200, chiefly fishermen.

Buoy.—A mooring buoy is laid down, with the tower on the eastern side of the bay bearing 122° distant 220 yards.

Wreck.—The wreck of a brigantine, which is not entirely submerged, lies near the entrance to the small harbor of Capraia. The wreck constitutes a menace to small vessels.

Semaphore.—A semaphore station is established on Mount Arpagna, 1,345 feet above the sea. The house is painted in white and black in chequers. Storm signals are exhibited at the semaphore.

Anchorage.—The bay is open to northeasterly winds, which cause a heavy sea. There is anchorage in from 12 to 14 fathoms, sand and weeds bottom, but the holding ground is only moderately good.

Communication.—Steamers from Leghorn call here twice a week, and from Genoa weekly.

There is telegraphic communication.

Tunny fisheries.—Tunny nets are sometimes laid out to a distance of about 100 yards from the coast near Punta di Porto Vecchio and Punta Mortola, 600 and 1,800 yards, respectively, northward of the port, and near Punta della Fica, $\frac{1}{2}$ mile southward of Punta Ferrajone.

The coast from Porto di Capraia trends northward $1\frac{1}{2}$ miles to Punta Teglia, the northern point of the island, on which there is a little fort with a turret.

The Formiche, a group of three or four rocks above water, lie about 400 yards northeastward of Teglia Point, the northern extremity of Capraia. Midway between them and the shore is a sunken

rock with 7 fathoms inside it. A tower stands a little southwestward of Teglia Point.

On the western side of Capraia, 3 miles southward of Teglia Point and close to the shore is the islet of Pajola, abreast which is the extinct crater of Cancelli, elevated 1,140 feet. Zenobito Point, the southern extremity of the island, is bold and has a tower on it, 1 mile northeastward of which are Scoglione Rocks a short distance offshore.

Telegraph.—A submarine cable is laid to the island of Elba. It is landed on the eastern side of Cape Ferrajone, under the light-house. Its direction (marked by two beacons in range) is 211° for 550 yards, thence 135° .

Cape Ferrajone—Lights.—An occulting white light, elevated 92 feet above the sea and visible 11 miles, is exhibited from an iron frame attached to a white stone building near the extremity of Cape Ferrajone.

Mole.—From the Inner Molehead, which projects southward from the northern entrance to the port a fixed green light, elevated 16 feet above the sea and visible 2 miles, is shown from a column 15 feet high, on a square masonry base. The light is obscured toward the land. (See Light List.)

Elba (ancient Ilva), the largest island of the Tuscan Group, is separated from the main by the Piombino Channel, 5 miles across. Elba is of triangular form with a rounded head to the westward, the coast being broken by a succession of deep bays and rugged headlands; it is $15\frac{1}{2}$ miles long east and west, and from 2 to 10 miles broad, and is high and mountainous, being traversed by three separate ridges, the western or highest culminating in Mount Capanne, 3,343 feet above the sea; the formation is chiefly granite, clay slate, and marble limestone. The western coast is bold and clear of danger at 200 yards distance, and elsewhere the shore may be safely approached to within 1 mile.

The island is healthful and the soil productive, and there are numerous springs and rivulets. Excepting the cork and chestnut there are not many forest trees, but evergreen shrubs cover a large extent of the hill slopes and fruits of various kinds are abundant. Marble is quarried and iron (for which Elba was noted even in the time of the Romans) is now most extensively worked, the principal mines being at Rio among the eastern hills. In the northern bays there are tunny fisheries and mullet and other fish in the surrounding waters.

Trade.—The chief imports are coal, building materials, engines, cereals, groceries, oils, iron, and steel. The exports consist of wine, fish, fruit, and iron, large quantities of the latter being smelted at

Porto Ferraio, Follonica, and adjacent ports. The population in 1911 was 29,549.

Porto Ferraio (ancient *Portus Argæus*), the chief town of Elba, is situated on the extreme western point of the eastern bay on the north shore of the island; it occupies a commanding position and is surrounded by fortifications; on the south side is the arsenal basin and naval depot, and within the moles a depth of from 7 to 3 fathoms over a space of about 8 or 6 acres. There is a Government house, two churches, town hall, military barracks, hospital, blast furnaces for smelting iron ore, and some small manufactories. In 1911 Porto Ferraio contained a population of 9,435.

The entrance to the bay, between Fort Stella on the west and Falconaia Point, is about 1 mile across, within which it opens out, extending 2 miles east and west and $1\frac{1}{4}$ miles north and south. The eastern shore is elevated, broken into coves and steep to within 200 yards of the shore. Nearly halfway along the southern shore is Le Grotte Point, at the foot of Monte Orello, and on which is the ruin of Giotone Castle; it is rather more than $\frac{1}{2}$ mile southward of the town, and between them the bay narrows and extends westward about 1 mile, forming an inner anchorage. On both sides of Le Grotte Point, and especially westward of it, the land is flat, and there are several salines or salt pans along the shore.

A shelving bank surrounds the southern and western sides of the bay, extending from 300 to 500 yards off, having from 6 to 15 feet over it, and a bar, over which is $3\frac{1}{2}$ to 5 fathoms, connects Le Grotte Point with the southern point of the Arsenal Basin. Westward of this is a pool with a depth of from 5 to 8 fathoms, mud and weed. There are depths of 20 fathoms at the entrance to the bay, shoaling gradually to 13 in the center; within 100 yards of the town walls is a depth of 5 fathoms, and that depth is found within $\frac{1}{4}$ mile of the southern shore.

To the southward of Tower Point, dredging operations have brought the depth at the entrance of the pool to 31 feet.

A channel, about 80 yards wide, has been dredged to a depth of 30 feet across the bar about 150 yards southward of Torre Martello, but shoal spits extend about 75 yards southward and southwestward from the tower; the light on the mole of the captain of the port is obscured over the spits. To the westward of the bar is an area, about 800 yards long northeast and southwest and from 100 to 600 yards broad, with depths of from 5 to 8 fathoms, and locally known as "La Fossa."

La Darsena, the entrance to which, between Torre Martello and the short mole of the captain of the port, extending southeastward from Gallo Fort, is 130 yards wide, and extends about 250 yards

northeastward with a breadth of 220 yards; there are depths of from $5\frac{1}{2}$ to 4 fathoms in the middle of the basin, decreasing gradually to the wharves around it; a short mole projects from the head of the basin, and is reserved for mail steamers. The basin is surrounded by the houses of the town, except on the southeast side, where, on the tongue of land named Linguella Peninsula, which terminates in Torre Martello, is the convict establishment.

Seno del Porticello, westward of La Darsena, is shallow, and an iron pier projects about 300 yards east-southeastward from the western shore, with a depth of 30 feet along the northern side of its outer part. The large ironworks of the Alti Forni, with three tall chimneys and a large black cylindrical reservoir, are on the west shore of the bay. There are also four chimneys to the northward of those just mentioned.

Scoglietto.—Three-quarters of a mile northward of Fort Stella is Scoglietto Islet, 65 feet high, which should be given 200 yards berth in passing on either side.

Bianco Shoal.—Half a mile westward of Scoglietto is the point of a rocky spit which extends 600 yards northeastward of Bianco Point. The shore between this point and Fort Stella is rocky for some little distance off.

Lightbuoy.—On the northeast edge of Bianco Shoal is moored in 9 fathoms a lightbuoy showing a flashing green light every 3 seconds, thus: Flash 0.3 second, eclipsed 2.7 seconds, visible 4 miles.

Lights—Scoglietto Islet.—A flashing red light, elevated 79 feet above the sea and visible 8 miles, is exhibited from a circular tower above a small yellow house, situated on the summit of Scoglietto Islet. Unwatched.

Stella Fort.—A flashing white light, elevated 206 feet above the sea and visible 18 miles, is exhibited from a white conical tower, 82 feet high, situated on the northeast bastion of Stella Fort. (For arc of visibility, see Light List.)

Gallo Fort.—A fixed red light, elevated 18 feet above the sea and visible 5 miles, is exhibited from an iron frame, with house at base, on the head of the mole of the captain of the port.

A fixed white light visible 4 miles is shown, at an elevation of 13 feet, from an iron standard on the head of the mole on the northern part of the basin (La Darsena.)

Two fixed red lights, vertical, visible 2 miles, are shown from a metal support on the pierhead in Porticello Bay. (See Light List.)

Rifle practice occasionally takes place from the vicinity of a beach eastward of Fort Inglese, when a red flag is hoisted at San Fine bastion, at the eastern end of the beach, which should then be given a berth of over a mile.

Buoys.—There are two cylindrial iron mooring buoys, one large and the other small, in La Darsena.

Anchorage.—Anchor in the outer anchorage with Forte Stella Lighthouse bearing 359° , and Torre Martello in line with the north-western extremity of Forte Inglese, 302° , in 9 fathoms, mud and weeds, and in the inner anchorage with the pierhead in Seno del Porticello 12° , distant 300 yards, in 8 fathoms water.

Winds from the eastward between north and south, especially between south and southeast, prevail in winter, when sometimes northerly winds are fresh, and cause much sea in the outer anchorage. In spring and summer northwest and southeast winds prevail, and there are sometimes violent southwesterly gales. Northwesterly winds in summer are sometimes so strong as to oblige vessels in the outer anchorage to drop a second anchor, but they generally decline some hours after sunset.

Monte Capanne seen amongst cumuli clouds indicates northwesterly winds; the mountains around Porto Ferrajo covered with clouds indicate southeasterly winds, which will be violent when the water in the port rises and remains above its normal level.

Communication.—There is a daily service of steamers between Porto Ferrajo and all the ports and roadsteads along the Elban coast, also steamers twice daily to Cavo, Piombino, and Port Vecchio; weekly steamers from Genoa, Leghorn, Naples, and Tunis call at Porto Ferrajo. There is telegraphic communication. A service of motor cars covers practically all the island.

Supplies.—Provisions can be obtained, but the supply is limited without previous notice. An aqueduct for supplying the town has been established at Porto Ferrajo capable of supplying 150 tons daily to vessels. A reserve reservoir contains 2,000 tons for the use of the Italian Navy. The water is supplied by a lighter with pump on board.

Hospital.—The civil hospital has 100 beds and receives patients.

Tunny fishery.—Tunny nets are laid in Porto Ferrajo, near Scarpellini Point in a southwest direction, and near Pina Point, in a northwest direction, extending 110 yards from the shore.

Coal is imported for private use of mines and blasting furnaces. There is no coal on sale.

Iron and iron ore are exported.

Repairs.—Small repairs to hull or machinery can be made at the Besano works, near the west gate of the town; the Alti Forni have also a work shop.

Cape Enfolà.—The coast westward from Stella Fort trends westward $3\frac{1}{2}$ miles to Cape Enfolà, an elevated headland connected to the shore by a narrow neck, and forming the eastern point of a bay about

3 miles in breadth and 2 in depth. Rocks both above and under water extend off the cape in a northern direction about 300 yards.

The eastern shores of the bay are broken into several coves with sandy beaches. The western side is bold, and the bay, generally without danger a short distance off, has depths gradually decreasing from 40 fathoms to 5, close in. On the western point is the Marina di Marciana, with a population of about 2,000, and along the shore westward there are many scattered houses.

Marina di Marciana—Mole.—A mole has been built at Marina di Marciana, which, beginning at the point immediately to the north-west of the town, extends 22 yards toward Cape Enfola, then bends in a circular direction toward the southeast, and continues in a straight line for 66 yards, the total length being 109 yards.

Buoy.—A red mooring buoy is laid out in Marina di Marciana Bay in $4\frac{1}{2}$ fathoms.

Firing practice with rifles occasionally takes place from near Torre di Marciana. During the practice a white flag, with a red disk in the middle, is hoisted at the tower, and then a good berth should be given to the coast between Punta del Nasuto and the tower.

Tunny fishery.—Tunny nets are laid to the eastward of Cape Enfola, extending 710 yards from the shore in a northerly direction; also near Fichetto Point, 110 yards from shore, in a northerly direction. Nets are also laid in Viticcio Bay, off Arena, Penisola, and Forno Points; also off Bagno di Marciana, extending 656 yards from the shore in 11° direction.

Polveraja Point—Light.—A flashing white light, elevated 170 feet, and visible 13 miles, is exhibited from an octagonal masonry tower, surmounting a one-story building, the whole painted white and situated on this point $1\frac{1}{2}$ miles west-southwestward of Cape St. Andre.

Telegraphs.—The submarine cable to Capraia is landed at Marina di Marciana; its direction is marked by two beacons. The front beacon, a post surmounted by a framework globe, is on the eastern side of the cable house, situated 54 yards from the sea, with the words "Telegraphs Sottomarine," on the side facing the sea, and the usual notice respecting prohibited anchorage above. It bears 358° from the rear beacon, on which bearing the cable is laid for 1,000 yards, thence 315° . The cable to the island of Pianosa is landed in Caroli Bay, southern coast, $2\frac{1}{2}$ miles westward of Cape Poro: its direction 182° for 900 yards is marked by two beacons in line and the usual notice, thence 205° .

The coast.—From the Marina di Marciana a bold coast trends about 271° 3 miles to Cape St. Andre, whence it rounds to the westward and southward, without any particularly marked feature, to

Fetovaja Point, distant 7 miles; about halfway between these points is the small island of Timoni close to the shore. The western extremity of Elba is about $\frac{1}{2}$ mile to the northwestward of Timoni.

Fetovaja Point is a narrow tongue of land projecting $\frac{3}{4}$ mile 147° , and $3\frac{1}{2}$ miles 91° beyond is Cape Poro, the clifly coast between being slightly curved, with a small bay in the center.

Campo Bay, between Capes Poro and Fonza (2 miles apart), is $1\frac{1}{2}$ miles in depth, terminating in a sandy beach, in the southern corner of which is the small village of Campo, with a tower on the point eastward of it; the bay is open to the southeastward. Streams from which water can be procured flow through some cultivated land at the head of the bay. Ariglia Rock will be seen on entering, lying $\frac{1}{4}$ mile off the eastern shore, and there are a few scattered rocks a short distance off the points of the bay, otherwise it is clear of danger, shoaling gradually from 30 fathoms at the entrance to 5 fathoms at 400 yards from the beach. Except with winds from the southeast, the bay offers convenient anchorage in from 6 to 8 fathoms, sand and mud, off the tower near the village.

Light.—A fixed white light, with red sector, is exhibited from the Marina di Campo Tower, visible 9 miles for the white and 5 for the red. Vessels working into the bay should not stand beyond the western limit of the illuminated arc, which leads clear of all danger on that shore. (For limits of visibility, see Light List.)

Campo Bay—Rock.—A rock, with a depth of $1\frac{1}{4}$ fathoms, is situated between Triglia Rock and Mele Point, at a distance of 150 yards from the latter.

Acona and Stella Bays.—Nearly 2 miles eastward of Cape Fonza is Cape Stella, a wooded promontory which projects $1\frac{1}{2}$ miles to the southward. On the western side of the latter cape, between it and Fonza, is Acona Bay; and on the eastern side is the larger bay of Stella. The slopes of the hills around Stella Bay are thickly wooded and the bay is clear of danger, there being a depth of 5 fathoms at 400 yards from the shore.

Gemini Island.—The eastern side of Stella Bay, from which project several rocky points, trends to the southward, and at 3 miles from the head of the bay is the small island of Gemini, a short distance from the shore.

Innamorata Creek—Light.—A fixed red light, elevated 19 feet above the sea, is shown from the end of an iron jetty, $16\frac{1}{2}$ yards long, in Innamorata Creek, situated northward of Gemini Islet, south coast of Elba.

Corbelli Rock.—Half a mile westward of Gemini is the Corbelli, a rock above water, with deep water between; vessels, however, should not pass between the Corbelli Rock and Gemini Island.

Cape Calamita, 1 mile to the southeastward of Gemini Island, is famous for loadstone, which is found and quarried from the mountain above.

Local attraction.—Vessels have found their compasses materially affected when approaching this and other parts of the eastern coast.

Riparti Point, the southeastern point of Elba, is an elevated headland, on the southwestern side of which is Rimaolo Rock above water; the shore is bold and bordered by high cliffs, and at 1 mile from it is a depth of 50 fathoms.

Cape Fīno lies 1 mile to the northward of Riparti Point.

Longone Bay.—Between Cape Gardo and Cape Arco $2\frac{1}{2}$ miles northward of it is a bay 2 miles deep and open to the eastward. The shore on both sides is rocky and indented with small coves, at the head of which are sandy beaches. Topi Islet lies close off the shore 1 mile northwestward of Cape Gardo, but there are no hidden dangers beyond 200 yards from the shore, at which distance 5 fathoms will be found throughout, except at the head and in the coves on the northern side. The water shoals gradually from 45 fathoms across the entrance to 6 fathoms about $\frac{1}{2}$ mile from the head of the bay; it then shelves up, and at 400 yards off the beach there are but 2 and 3 feet; the bottom is chiefly mud, sand, and weed.

The hills slope steeply down on all sides, and the western and southern sides are well covered with wood. About 1 mile from the head of the bay is the village of Capoliveri.

Port Longone.—At the head of a small cove on the northern side of the bay is the town of Longone, containing a population of about 4,587, who are chiefly employed in fishing. The principal industries are mining, sardine and anchovy fishing, and the production of wine. It is strongly fortified, a citadel occupying an elevated position on a bold promontory eastward of the town, and on a rocky point on the south shore is Fort Focardo. The port is about 300 yards each way; from the eastern shore is a pier about 200 feet in length, inclosing depths of from 5 fathoms near the entrance to 18 and 11 feet within. A good road was made during Napoleon's residence across to Porto Ferraijo.

Wharf.—A wharf for the use of coasting vessels was constructed in 1907.

Mole extended—Provisional light.—The small mole southeastward of the port office is to be extended to a total length of about 90 yards. A provisional fixed green light has been established at the head of the mole, and this light will be moved out as the work progresses.

Mooring buoy.—A gray mooring buoy has been laid down by the Società Elba, about 77 yards south-southwestward from Cape Bianco Pier.

Lights—Focardo Point.—An occulting white light, elevated 105 feet above the sea and visible 16 miles, is exhibited from an octagonal tower 21 feet high on Focardo Point.

San Giovanni Point.—A fixed red light, elevated 46 feet above the sea and visible 4 miles, is exhibited from a rectangular shed on San Giovanni Point, the western point of the port.

A white light on the port office mole, visible 7 miles. (See Light List.)

Innamorata Cove—Mole Light.—A fixed red light has been established on a mole recently completed (1915) extending from the shore 164 yards west-northwestward, in Innamorata Cove.

Approximate position, latitude $42^{\circ} 43' N.$; longitude $10^{\circ} 22' E.$ (See Light List.)

Mooring buoys.—Four mooring buoys have been established for the use of the Elba Company near the east coast of Elba, northward of Cape Arco. One lies about 100 yards northeastward of the Cannelle Bridge, Cape Arco, two others lie about 1,250 yards 98° and about 1,450 yards 111° , respectively, from the trigonometrical point on Mount Arco, and the fourth at about 87 yards east-northeastward of the loading pier at Ortano. There is a yellow cylindrical iron mooring buoy in the entrance to the port.

Anchorage may be had in the port a little outside the pier in 6 and 7 fathoms, from whence coasting vessels might in the event of easterly winds haul farther in; large vessels anchor in the bay with San Giovanni Point Lighthouse bearing 314° , and San Vincenzo Point 68° , in 8 fathoms. Small craft obtain shelter from south-easterly winds about 100 yards off the south shore, with San Giovanni Point Lighthouse bearing about 22° , in 4 fathoms water.

Supplies are plentiful. Water may be obtained from the port office mole. Near the above-mentioned chapel is a fountain and several small streams from which water can also be procured.

Coal is imported for private use only.

Communication.—There is a motor car, by a good road, to Porto Ferrajo twice daily, which connects with the steamers to and from Piombino. There is telegraphic communication.

The coast.—Three-quarters of a mile from the citadel is a watch house on Royal Point, southward of which shallow water extends about 200 yards offshore. Nearly 2 miles from Cape Arco is Cape Ortano, and between them is a small sandy bay, off the south shore of which is a small island; down the valley, between high wooded hills, runs the largest stream of the island, rising near the mountain village of Rio.

Rio Marina, nearly 1 mile northward of Cape Ortano, is the shipping place for the iron ore from the mines, situated chiefly in a deep gorge of the mountains to the westward. Vigneria, Portello, and Rio Albano are shipping places northward of Rio Marina.

Rio Rock (locally called Isolotto).—Off the shipping place of Rio Marina is a large rock with deep water around it. This rock is connected with the mainland by a breakwater; on the northwest side bollards have been established to serve as stern mooring for small vessels.

The pier at Rio Marina has been extended to a length of 110 yards.

At Vigneria are situated two piers near one another, each about 65 yards long. There are several houses along the shore. The iron mines, for which Elba is noted, are chiefly in a deep gorge of the mountains above, and from hence the ore is taken for the purpose of smelting.

Buoy.—A gray mooring buoy lies about 87 yards northward of the Scoglietto Jetty.

Light—Breakwater.—An occulting red light, exhibited 39 feet above the sea and visible 1 mile, has been established on a post on the summit of Rio Rock. (See Light List.)

Mole under construction—Light.—A mole is under construction northward of Rio Marina. The mole will extend 110 yards 105° from a point 435 yards 356° from the fixed white light on the head of the mole at Rio Marina.

A fixed green light, visible 3 miles, is established at the head of the construction work and is moved out as the work progresses.

Caution.—On account of the work in progress for the construction of the port of Rio Marina, vessels are forbidden to approach the roads in the pass between the Scoglietto and Voltoni Jetties, where material is being deposited for the foundation of the new mole.

Lights—Rio Marina.—A fixed white light, elevated 28 feet above the sea and visible 2 miles, is shown from an iron pillar at the end of Rio Marina Jetty. Unwatched.

A fixed white light, elevated 23 feet above the sea and visible 2 miles, is shown from a small crane on Vigneria pier end. Unwatched. (See Light List.)

Supplies—Coal.—No stock of coal is kept, except for steamship companies.

Anchorage can be obtained in 11 fathoms water about 400 yards eastward of the head of Vigneria Jetty.

At Portello, about $\frac{1}{2}$ mile north of Vigneria, an iron pier 260 yards long has been built. A fixed red over a fixed white light, elevated, respectively, 56 and 40 feet and visible 2 miles, are shown from a metal support at the end of the pier. Supplies are plentiful and cheap; water can be obtained from the pier at Rio Marina.

Cape Pero.—The coast from Rio Marina to Cape Pero, 2 miles distant, is bold, with deep water close in.

Shoal.—A rocky shoal of 7 fathoms lies $\frac{1}{2}$ mile 94° from Cape Pero.

Piers.—Two piers, each about 30 yards long, are situated close westward of this cape, and three piers at about $\frac{1}{2}$ mile to the southward; the northern of these, at Rio Albano, has been extended to a length of about 200 yards and is marked by a fixed white light over a fixed red light.

Telegraph.—A submarine telegraph is laid to Piombino; the end is landed about $\frac{1}{2}$ mile to the northwestward of Cape Pero.

Light.—A fixed white light, elevated 36 feet above the sea and visible 5 miles, is exhibited from a small metal tower on stone building situated near the bridge at Cape Pero. Unwatched.

The coast.—A similar shore trends from Cape Pero to the northwestward 2 miles to Cape Vita, the northern extremity of the island. Halfway is a bay with a sandy beach along which are some cottages and the chapel of St. Menato. The northern point of the bay is a sharp projection on which are some defensive works, and a short distance out is the island of Topi, with 10 fathoms close outside and 5 within it; a few rocks, but close in, lie on the western side of the point, whence a sandy beach curves around to Cape Vita.

A shoal of only $4\frac{1}{2}$ fathoms lies 350° , nearly $\frac{1}{2}$ mile from Cape Vita. The bottom is gravel, sand, and weed.

The eastern mountain range of Elba slopes to a broken coast line, extending in a southwestern direction 5 miles from Cape Vita to the head of Ferrajo Bay; it is partially wooded and watered by several small streams. The shore is bold with but one patch of rocks (lying a short distance off, abreast some reddish cliffs); and 10 fathoms will be found all along it at 200 yards from the land.

Mount Grosso—Semaphore.—Vessels proceeding to Genoa and hoisting a ball below the number will be reported to the Consorzio Autonomo.

Semaphore.—A semaphore is established on Mount Grosso at an elevation of 1,139 feet above the sea.

Palmajola Island and Channel.—Nearly $2\frac{3}{4}$ miles 102° from Cape Vita and $1\frac{1}{2}$ miles 52° from Cape Pero is the island of Pالماجولا, 300 feet high, with a rounded green surface. A rock above water and a reef over which is 15 feet extends about $\frac{1}{4}$ mile to the northeastward; on the southern side the island is bold, with 8 fathoms close to the shore and from 10 to 18 fathoms in the channel between it and Elba.

Light.—On the summit of Pالماجولا Island is a white rectangular tower, with dwelling attached, from which, at an elevation of

344 feet above the sea, a flashing white light is exhibited visible 24 miles. Between Palmajola and Piombino is the Piombino Channel.

A black ball hoisted at Palmajola Lighthouse indicates urgent necessity for help.

Fog signal.—A fog signal, consisting of a bell which sounds 1 stroke every 15 seconds, is established at Palmajola Island Light Station.

The bell is elevated 328 feet above the sea. (See Light List.)

Cerboli Island.—Nearly $3\frac{1}{2}$ miles 100° from Palmajola is the small island of Cerboli, with three summits, 243 feet high. It lies in a southwest and northeast direction, is $\frac{1}{2}$ mile in length, and very narrow; on the center summit is a tower, and, the water being deep, it may be closely approached on all sides except the northwest.

Pianosa Island, lying about 7 miles 206° from the southwestern extremity of Elba, is 3 miles in length nearly north and south and $2\frac{1}{2}$ miles in breadth over the southern half. The northern part of the island projects northward, forming a long, narrow point nearly 2 miles in length and varying from 200 yards to $\frac{1}{4}$ mile in width. The island is very flat except at the southeastern end, where it is 95 feet high. A tower stands on the southwestern point of the island.

Cala San Giovanni.—The church, houses, and some ancient ruins are on the eastern side, on a point eastward of a sandy bay named Cala San Giovanni, defended by a battery. The port or landing place is between a mole on the northern side of the point and the battery west of it; there is also another on the southern side. There is a penal settlement here. Pianosa (ancient Planacia) in early days supplied Rome with marble. When Napoleon was at Elba, the island, then called Pia Nosa, was uninhabited; in 1835 it was colonized by some agriculturists, which with a few fishermen composed the population until its establishment as an Italian penal settlement. The island is fertile and the vine is extensively cultivated. There is communication with the mainland by weekly steamer.

Dangers.—The former shoal, with $8\frac{3}{4}$ feet of water, 191 yards northward of the battery light in the Cala San Giovanni, has been dredged to $3\frac{1}{4}$ fathoms; between this depth and that of $8\frac{1}{4}$ feet, more to the southward, there is a depth of $2\frac{1}{2}$ fathoms.

About 400 yards, 57° from the mole are two rocks nearly in line, on the same bearing, and 600 yards 158° from Scola Islet (abreast the lighthouse) is another, with $1\frac{1}{2}$ fathoms of water over it.

Beacon.—A pyramidal beacon 46 feet high, painted in black and white bands, has been erected on the shore of Cala San Giovanni, 711 yards 311° from the battery light, this beacon in range with Belvedere House 268° clears the shoal water off the mole.

Scarpa Rock.—Off Marchese Point the northern end of the island is Scarpa Rock, above water: several rocky patches of from 1 to $2\frac{1}{2}$

fathoms water lie around Scarpa Rock, and it should not be approached within $\frac{1}{2}$ mile.

Telegraph.—The cable to Elba is landed in Cala San Giovanni, close to the lighthouse, and its direction is 38° for 1.2 miles (marked by two beacons in range), thence 25° .

The notice board is on the rear beacon, at the boundary wall between the free colony and penal settlement.

Supplies can be procured, and small game abounds. Water may be obtained from a fountain on the beach at the settlement.

Lights.—A flashing light is exhibited from a tower painted white and blue in horizontal bands over a yellow dwelling, situated on the point near Scola Islet, on the eastern side of the penal establishment, at an elevation of 140 feet above the sea. The flash is visible 18 miles.

A fixed green light, elevated 72 feet above the sea and visible 4 miles, is exhibited from a white pillar, 5 feet in height, on a battery, western side of the port. (See Light List.)

Africa Rock and Shoal.—Nearly $13\frac{3}{4}$ miles 189° from Pianosa Lighthouse is Africa Rock, 6 feet above water, on which is a lighthouse; shoal water extends nearly $\frac{3}{4}$ mile north-northeastward and south-southwestward from it, and the rock should not be approached within 1 mile. About $2\frac{1}{2}$ miles 29° from the rock is Africa Shoal, or Formiche di Monte Cristo, a patch of 15 feet, nearly $\frac{1}{2}$ mile from which, in the same direction, is another of $3\frac{1}{2}$ fathoms. Between the rock and the shoal are depths of from 10 to 17 fathoms.

Light.—A flashing white light, elevated 56 feet above the sea and visible 13 miles, is exhibited from a hexagonal iron frame, 52 feet in height, situated on Africa Rock.

The following night signals are made from the lighthouse: Obscuring the light toward Pianosa Island, calls attention; light eclipsed twice, at intervals of two minutes, doctor needed; light eclipsed three times, at intervals of three minutes, apparatus damaged. These signals will be made one hour after the time of lighting. (See Light List.)

Monte Cristo (ancient Oglaso) lies 10 miles 102° from the Africa Rock; it is about $2\frac{1}{2}$ miles in length north and south and a little less in breadth, bold upon all sides, its summit being 2,093 feet above the sea. On it are the ruins of the ancient church and monastery of St. Manugliano, formerly tenanted by Camaldolese monks, but wild goats are now nearly the sole occupiers of the island, which has been made into a small penal settlement. The only landing place is in the Cala Maestra. The soundings are very deep around it, there being 60 fathoms within $\frac{1}{2}$ mile of the shore.

Buoys.—There are two mooring buoys in Cala Maestra, lying 131 yards eastward and westward of each other, one cylindrical and the other conical, both painted white.

Telegraph cable.—A telegraph cable is laid from Cala Maestra, Monte Cristo Island, to Pianosa. Vessels anchoring in Cala Maestra must be careful to avoid damaging the cable, which, starting from a point about 219 yards eastward of the point of the creek, passes over the western mooring chain of the outer of the two buoys, and runs about north-northwestward across the summit of Point Portale, then bending a little to the westward.

Formiche di Grosseto.—These islets or rocks, lying about $7\frac{1}{2}$ miles to the southwestward of Ombrone River, on the coast of Italy, extend 2 miles in a north-northwestward and south-southeastward direction.

The North Rock, which is the largest, is $\frac{1}{4}$ mile in length and 32 feet high; two rocks lie off its northern end and a reef projects 300 yards from the southern end. About 700 yards 322° from the northern end is a rocky patch of $1\frac{1}{4}$ fathoms, between which and the rock is a depth of 40 fathoms.

The Middle Rock is $\frac{1}{4}$ mile 147° from the above, narrow, with a rock above water on the eastern side. A shoal extends a short distance off its southern end, and there is only 5 fathoms 200 yards off the northern end; in the channel between it and the North Rock there are depths of 20 to 40 fathoms, and above 50 in that between the Middle and South Rocks.

The South Rock, 800 yards 150° from the Middle Rock, is very small, and 13 feet high; it should not be approached within 500 yards, as, except on the western side, shoal water extends off it. The bottom is of gravel and mud. During gales of wind there are overfalls about $\frac{1}{2}$ mile southward of the South Rock.

Light—Formiche di Grosseto.—A flashing white light, elevated 77 feet above the sea, and visible 14 miles, is exhibited from a cylindrical masonry tower, 38 feet high, painted white and black in horizontal bands, situated on the summit of North Rock, Formiche di Grosseto.

The following signals have been instituted at this lighthouse: Black flag with white ball in center indicates doctor required; black and white checkered flag indicates apparatus damaged; black ball, urgent necessity for help. (See Light List.)

Giglio (ancient Igilium) is the third largest of the Tuscan Group, and nearly equal in size and somewhat similar in shape to Capraia; it lies nearly $7\frac{1}{4}$ miles westward of the promontory of Argentario, is $4\frac{1}{4}$ miles in length north and south, and from $1\frac{1}{2}$ to $2\frac{1}{2}$ miles in breadth; is rugged, well wooded, and its summit, on which is a

small beacon, is 1,634 feet above the sea. On the western side of the island is a bay called Campese Gulf, with a sandy beach at the head and a tower on its eastern shore; and with the exception of a few rocks lying 200 yards off the cliffy coast northward of the tower, the water is very deep. From this bay the west coast of the island trends southward, forming a broad headland, off the center of which, named Pazzarelli Point, are some rocks. Southward the coast is bold and cliffy to Capo Rosso, the southern point of the island, close off which are some rocks above water.

Semaphore.—A semaphore has been permanently erected on the castle of the island, and is 1,312 feet above the level of the sea. Vessels can communicate with this station.

Croce Rock.—The eastern shore is more indented than the western but equally clear of danger except to the northeastward, where at $\frac{3}{4}$ mile 102° from Fienao Point, is Croce Rock, on which is 15 feet water; it lies $\frac{1}{4}$ mile offshore with 22 fathoms between.

Port Giglio is situated on the east coast in a small bay about 1 mile wide; on the northern point is a lazaretto tower, and off the southern, named Castellari, are several islets. A mole from the southern shore protects the beach, round which are a few houses, and within it is a depth of 12 feet. The town is on the highland, 1,335 feet above the sea; the population is chiefly engaged in agricultural pursuits and in fishing for pilchards; there are quarries of beautiful marble and iron mines; and with small quantities of wine, timber, and fish form a limited export trade.

Telegraph.—The cable to Mount Argentario is landed near the mole in Port Giglio; its direction is marked by two beacons, the front one with the notice board attached.

Lights.—From an octagonal yellow tower 33 feet in height, situated on Fenaio Point, Giglio Island, elevated 129 feet above the sea, a flashing white light is exhibited, visible 17 miles.

From an octagonal yellow tower situated on Capo Rosso Point (the southern point of the island), elevated 295 feet above the sea, a flashing white light is exhibited, visible 24 miles, but is obscured by Giannutri Island (8°).

An occulting red light, elevated 24 feet above the sea and visible 6 miles, is exhibited from the end of molehead, Port Giglio. (See Light List.)

Soundings.—At about $3\frac{1}{2}$ miles westward of Giglio Island there are above 100 fathoms; in the channel between it and Argentario from 60 to 70, and southward Giannutri from 70 to 80 fathoms, mud bottom.

Giannutri Islet (Dianium of the Greeks, Artemisia of the Romans), $8\frac{1}{2}$ miles east-southeastward from Rosso Point, the southern extremity of Giglio, is an irregular crescent in form, with the con-

vex side to the westward, $1\frac{1}{2}$ miles long north and south, and from $\frac{1}{4}$ to $\frac{3}{4}$ mile broad. The summit of the island, near the southern end, is 305 feet high, and elsewhere the hills are from 272 to 141 feet in height. The coasts are rocky and steep-to, the only exception being a spit with 2 fathoms water which projects 100 yards northward from Punta Secca, the northern point of the island. There is no water on the island except what is obtained from reservoirs for rain.

Cala Maestra, on the northwestern side of the island, can only be used by small craft in fine weather; there is no anchorage off it, as the depths increase rapidly. There are some ruins of Roman buildings near the cove, and a square gray house on Punta Scaletta, its northern point. It is the only locality in the island, except the lighthouse, which is inhabited, and here there are a few fishermen.

Spalmatoi Bay, on the eastern side, extends $\frac{1}{2}$ mile northwestward from its entrance between Punta del Calettino and Punta di San Francesco, $\frac{1}{2}$ mile northeastward, and its shores are generally bare and rocky; the depths decrease from 30 fathoms in the entrance to about 10 fathoms near the shores; although affording shelter from all but southeast winds, the holding ground is bad.

Light.—A flashing white light is exhibited from a white octagonal tower 30 feet high, with white dwelling attached, on a hill about 200 yards northwestward of Rossa Point, the southern point of the island, elevated 200 feet above the sea, visible 15 miles.

Communication.—A boat is sent to Giannutri from Porto Ercole every 15 days.

CHAPTER VI.

THE ISLAND OF SARDINIA.

North coast.—Capo Testa (the ancient Erebantium Prom.) forms with Capo Feno (Corsica), which bears 347° , distant 9 miles from it, the western entrance to Bonifacio Strait. Capo Testa, a small peninsula, nearly circular, is united to the coast by a neck of sand, and rugged; its western face is formed of bare granite cliffs, fringed with rocks which extend seaward $\frac{1}{2}$ mile. A signal tower, named Torre Santa Retarata, stands on its summit at an elevation of 417 feet above the sea.

Light.—Near the northern extremity of Capo Testa a white square tower, 76 feet in height and surmounting a white dwelling, exhibits at an elevation of 220 feet above the sea an alternating fixed and flashing white and red light; it is visible 20 miles. (For arc of visibility see Light List.)

Lloyd's signal station—Semaphore.—Near the lighthouse is a Lloyd's signal station and a black and white semaphore, at an elevation of 137 feet above the sea, with which vessels can communicate.

Outlying dangers.—North Testa Rock, about 20 yards in diameter and with a depth of $3\frac{1}{2}$ fathoms, lies 264° 1.1 miles from Capo Testa Lighthouse.

South Testa Rock, 30 yards in diameter, with a least depth of 4 fathoms, lies 236° 1.6 miles from Capo Testa Lighthouse.

There is deep water between these rocks and the shore.

Foul rocky ground extends 800 yards westward of the cape.

Two shoals of small extent, with the least depth of $4\frac{1}{2}$ and 4 fathoms, lie respectively 220° distant $\frac{3}{4}$ mile, and 211° 1,800 yards from Torre Santa Reparata, and there are other shoals between these and the shore.

Baia di Santa Reparata.—On the northern side of the promontory of Capo Testa is Cala Spinosa, a small cove, and farther eastward Baia di Santa Reparata, formed by the neck of sand uniting the promontory to the coast, is nearly circular, 800 yards deep, with 11 fathoms water at the entrance, which depth diminishes gradually to the beach. Small vessels here find shelter from nearly all winds, being only exposed to the northwesterly swell when the wind is from

that quarter. A chapel stands near the beach in the western corner of the bay. Near Cala Spinosa the columns for the Pantheon of Rome were said to have been quarried, and many shafts and other parts of such-like structures were, not very long since, lying near the chapel on the beach.

Water may be procured from a grotto near the sea.

Isolotto Monica, about 1 mile northeastward of Baia di Santa Reparata and lying close to the coast, is 400 yards in length, in a north and south direction, surrounded by rocks and shallow water, and from it the rocks extend nearly 400 yards to the northeastward and northwestward.

Porto Longosardo, entered $\frac{1}{2}$ mile southeastward of Isolotto Monica, extends $\frac{3}{4}$ mile in a south-southwesterly direction, and is about 700 yards wide at the entrance, but narrows to 200 yards across, at nearly halfway in, where, abreast Santa Teresa Gallura Village, there is only a depth of 5 feet, over a bottom of mud and weed; outside this are depths of 3 to 10 fathoms.

The port is used by small vessels, which find fair shelter, and no great inconvenience from northerly winds. A circular tower, 130 feet above the sea, at the southwestern end of a triangular wall, stands on the western point of entrance; near the western shore of the port, southwestward of the tower, is the village above mentioned, and on a height on the opposite side of the inlet is a castle in ruins.

Shoals.—At about 700 yards from the shore, and 16° from the above tower, is a rocky shoal with 11 feet water over it, and, nearly midway between it and the shore, another shoal on which the depth is 3 fathoms.

A shoal with a depth of 11 feet over it lies 1,600 yards 40° distant from the town.

Buoys.—Both the 11-foot shoals are marked by buoys. The one on the starboard hand, entering, is a black conical buoy with black staff and cone; that on the port hand is a red conical buoy with red staff and drum.

Communication.—Steamers between Porto Torres and Genoa call here, and there is telegraphic communication at limited hours.

Supplies.—Fresh provisions in small quantities may be obtained.

Landing.—A small landing mole is situated at the head of the port.

Punta Falcone, $1\frac{1}{4}$ miles eastward of the tower on the western side of the entrance to Porto Longosardo, and the northern extremity of Sardinia is moderately high and rugged, and between it and Punta Marmorata, $\frac{1}{2}$ mile farther eastward, rocks and shoals extend for nearly $\frac{1}{4}$ mile in a northeasterly direction. The coast between Porto Longosardo and Punta Falcone is foul, especially on the

western side of the entrance to Porto Quadro, where a group of rocks extend 200 yards from the shore.

The strait, between Punta Falcone and Secca Lavezzi, from the 5-fathom curve is 3 miles wide, with depths of from 35 to 38 fathoms in the center.

Signal station—Semaphore.—On Punta Falcone is a black and white semaphore, with which vessels can communicate.

Submarine vessels—Caution.—See page 37.

Contra di li Scale—Beacon.—On Contra di li Scale, a hill 367 feet high, about 1,200 yards southward of Punta Falcone, is a white masonry beacon. A line through this beacon and a similar one on Punta Marmorata marks the western territorial limit of the Sardinian tunny fisheries.

Isole Marmorata.—About $\frac{1}{2}$ mile east-southeastward of Punta Falcone is Punta Marmorata, with a white masonry beacon on its extremity, and close beyond it and near the coast are two islets of the same name, lying in a northeast and southwest direction; rocks and shallow water extend 600 yards to the northeastward of the islets; also about 300 yards eastward.

Punta Monterosso, 2 miles southeastward of Punta Marmorata, is rugged and surrounded by rocks, which extend $\frac{1}{2}$ mile to the northeastward; the outer of these rocks, named Paganetto, is awash. Scogli Colombo lie near the coast about $\frac{1}{2}$ mile to the southeastward of the point.

Beacon.—Scoglio Paganetto is marked by a white iron pole beacon and surmounted by a flag, but no dependence should be placed on it.

Secca Colombo, having a depth of 23 feet, is of small extent and situated southeastward distant 900 yards from Scoglio Paganetto.

Clearing mark.—The southwestern point of Isola di Santo Stefano in line with Punta Sardegna, bearing 123° , leads to the northward of Scoglio Paganetto and Secca Colombo.

Porto Pozzo, a narrow vein of water, with depths of from $3\frac{1}{2}$ to 8 fathoms, extends for a distance of nearly $1\frac{1}{2}$ miles, between the main island and the western side of Isole delle Vacche. The entrance is about 200 yards in width in the deep-water channel, from which the inlet slightly enlarges in width, and at the distance of $1\frac{1}{4}$ miles it is about 300 yards wide, with a depth of $3\frac{3}{4}$ fathoms, over mud and weeds. At the head of the inlet there is a basin, somewhat circular, with from 5 to 8 fathoms of water, over mud.

Although the mouth of the inlet is open to the northward, it is not much affected by the sea, being protected by the islands and south coast of Corsica.

Anchorage.—The anchorage is on the island side, 1 mile within the entrance, in 6 fathoms water, over a bottom of mud and weeds;

to the southward the shore is a sandy beach, and here several small streams flow into the sea.

Isole delle Vacche, which bounds the eastern side of Porto Pozzo, is 1.6 miles in length in a north and south direction, 308 feet above the sea, and united to the main island by a small neck of sand. A shoal, with $3\frac{1}{2}$ fathoms water over it, extends about 600 yards northward of the island, and its eastern coast is bordered by shallow water extending for a distance of about 400 yards.

Beacon.—Secca Macchiamala, nearly 1 mile south-southeastward of the northern point of the island, and extending about 400 yards from the shore, is marked by a white iron pole beacon, surmounted by a red flag.

Porto Liscia, a nearly semicircular bay, is formed between the southeastern side of Isole delle Vacche, and Isole Cavalli, which is nearly $\frac{1}{2}$ mile in length, in a north and south direction, 52 feet above the sea, and also joined to the shore by a small sandy neck. The bay, $\frac{3}{4}$ mile wide at its entrance, is open to the northward, but there is some shelter in the western corner under Isole delle Vacche, in about 11 fathoms water, over weeds. Fiume Liscia, having its source in the mountains beyond Tempio Pansaia, flows into the bay, after winding down the hills, and out through a marshy plain.

A weedy shoal, with 5 fathoms water over it, lies at the entrance to Porto Liscia, and southeastward, distant 600 yards from the eastern point of Isole delle Vacche, and a bank, about 100 yards in extent, with a least depth of $3\frac{1}{2}$ fathoms, lies within the port, and bears 199° , distant 900 yards from the same point.

Porto Pollo, on the eastern side of Isole Cavalli, is a bay about 1 mile deep and 800 yards wide at the entrance, with irregular shores; the shore at the head of the bay is a continuation of the low sandy beach of Porto Liscia. An islet, 46 feet above the sea, lies in the inner part, but the passage northward and eastward of it is only suitable for boats.

Anchorage.—Large vessels may anchor, in case of necessity, in the entrance, in 9 fathoms water, over weeds partially sheltered from northerly winds by the islands in the vicinity. To the southward of the islet there is excellent anchorage for small vessels, in a depth of about 8 fathoms: a shoal, with 2 fathoms water over it, lies $\frac{1}{4}$ mile northwestward of the island.

Coast.—From Punta Diego, on the eastern side of the entrance to Porto Pollo, and off which a shoal extends 300 yards in a northwestern direction, the coast, for a distance of $1\frac{1}{4}$ miles, in an easterly direction to Punta Sardegna, is clear of danger. Cala di Trana, $\frac{1}{2}$ mile westward of Punta Sardegna, is open to the northward, has from 5 to 8 fathoms water, a sandy beach, and is used by coasting vessels. Punta Sardegna forms, with Isola Maddalena, a channel $\frac{3}{4}$

mile wide, which will be described with the adjacent islands. (See Caution, page 401.)

Light—Punta Sardegna.—A flashing white light is exhibited from a white building, situated near the northern extremity of Punta Sardegna; the center of the lantern is elevated 115 feet. (See Light List.)

Water.—There is a spring of good water in Cala di Trana.

Submarine telegraph cable.—A telegraph cable connects Isola Maddalena with the main island in the neighborhood of Punta Sardegna.

Rada di Mezzo Schifo (Agincourt Road).—From Punta Sardegna the coast is clear and bold, and trends southward $1\frac{1}{2}$ miles nearly to a bay named Mezzo Schifo, with a sandy beach at its head; the bay is said to be safe and commodious for all classes of vessels, and though open to the northward no great sea sets in, and the holding ground is good.

Anchorage.—The anchorage, in 11 fathoms water, over weed, is southeastward of Punta Stropello, about $\frac{1}{4}$ mile from the shore, with Punta Sardegna bearing 331° , and Capo Ferro Lighthouse in range with the southern point of Santo Stefano, bearing 110° ; in the northern part of the road the holding ground is bad.

Secca di Mezzo Passo, a group of three black rocks 2 feet above the sea, lies $\frac{1}{2}$ mile to the southwestward of Fortè Tegge, Isole Maddalena.

Beacon.—A white pyramidal stone beacon marks the rocks.

Secca del Parau or Paura, a group of four rocks about 3 feet above the sea (with a rock awash on their western side), lying about 800 yards south-southeastward of Mezzo Passo, are on the eastern side of the main channel; the water is deep 200 yards from them.

Beacons and buoy.—The western and southern extremities of the rocks are marked by white stone pyramidal beacons; the northeastern extremities by a white conical buoy, surmounted by a cylinder with "Parau" on it in black.

La Paura Islet—Beacon.—A white truncated pyramidal masonry beacon, 7.8 feet high, is erected on the shoal close to the 13-foot sounding west-northwestward of La Paura Islet.

Prohibited anchorage.—Between a line joining Punta Sardegna and Punta Nido d'Aquila on Isole Maddalena in an east-northeastward direction, and a line from Punta Stropello, 104° to the south beacon of Secca del Parau, from which it is extended northeastward to Punta Nera on Isole Maddalena, in an area over which anchorage is prohibited.

Parau is the name of a bay $\frac{3}{4}$ mile southeastward of Mezzo Schifo. On the western side of the bay is the village of Parau, where a small

quantity of fresh provisions and a plentiful supply of water may be obtained; there is also a small pier about 100 feet in length.

Secca Due Piagge—Beacon.—A shoal, with 13 feet of water over it, lies 400 yards westward of Punta Nera, the eastern point of the bay, and is marked by an iron pole beacon surmounted by a white cylindrical topmark.

Capo d'Orso is the termination of a high, barren mount of the same name, the sharp, rocky summit of which, from some points of view, resembles a bear reclining, whence it takes its name. Between the cape and Rada di Mezzo Schifo, a distance of $2\frac{1}{4}$ miles, the coast is fringed by rocky and foul ground extending seaward nearly 300 yards.

A rocky shoal of small extent, having a depth of $5\frac{1}{2}$ fathoms over it, lies in the channel between Capo d'Orso and Isolotto Porco, and bears 104° , distant 1 mile from Capo d'Orso.

Golfo Saline, 1 mile southward of Capo d'Orso, is nearly 1 mile deep and $\frac{1}{2}$ mile wide at the entrance, with 9 fathoms water in the center, and 3 fathoms near the beach at its head; though open to the eastward it is somewhat protected by Punta Rossa, Isole Caprera.

Anchorage.—There is anchorage at the entrance and within the bay, in from 8 to 12 fathoms water, over a bottom of weed.

Golfo di Arsachena.—From Golfo Saline the coast trends to the southward for a distance of 3.3 miles to the head of the Golfo di Arsachena. From Capo Tre Monti, on the eastern side of entrance, the gulf is about $2\frac{3}{4}$ miles deep, $\frac{3}{4}$ mile wide, with from 5 to 11 fathoms water, over mud and weed, and affords shelter to all classes of vessels; this anchorage was much used by Lord Nelson.

The head of the gulf as well as its western shore is shallow, and should be cautiously approached; off the eastern point there is a rock nearly 700 yards off, but above the shore is less foul. The entrance to this gulf, open to the northward, is formed between Punta Arsachena, on the west, and Capo Tre Monti on the east, the former being $2\frac{3}{4}$ miles to the southward of Capo d'Orso, and the latter 3 miles southeastward of the same cape.

Beacon.—A rock, with 5 feet water over it, is situated 650 yards 170° from Punta Arsachena, is marked by an iron pole beacon, surmounted by a sphere.

Capo Tre Monti, the termination of a height with three peaks immediately within it, is bordered on its western side by shallow water, which extends off about $\frac{1}{4}$ mile. The whole space between Capes Orso and Tre Monti affords shelter from all winds, and is protected by Caprera and the other islands from the sea caused by northerly gales.

A shoal extends 300 yards northwestward of Punta Battistone, 1 mile eastward of Capo Tre Monti.

Secca Tre Monti.—A rocky shoal, with 17 feet water over it, lies 1,600 yards 348° from Capo Tre Monti; there are depths of from 14 to 21 fathoms between.

The southwestern point of Isola Santo Stefano just open of Capo d'Orso, bearing 300°, leads to the northward of Secca Tre Monti.

Lightbuoy.—A lightbuoy, exhibiting a flashing red light, is moored at a distance of 100 yards 64° from the center of Secca Tre Monti. It is visible 6 miles. The light support has horizontal red and black bands. (See Light List.)

Anchorage.—At the entrance to the gulf and $\frac{1}{2}$ mile off either point, there will be found depths of from 7 to 11 fathoms, over good holding ground, and sheltered from all winds, especially those from the eastward, round south, to about northeast. This anchorage is named Rada di Arsachena; a fair berth is in 11 fathoms water, on the parallel of Capo Tre Monti, halfway between it and the western shore; inside the gulf the 5-fathom curve extends generally from 600 to 800 yards from the shore on either side, leaving only a narrow vein of depths of from 6 to 10 fathoms between.

Prohibited anchorage.—Anchorage is prohibited within the area bounded to the eastward by a line joining Isoli Pecora and Cappuccini, and to the westward by a line joining Isolotto Porco and Capo Tre Monti.

Landing is prohibited in the vicinity of Capo Tre Monti battery; also on any part of the coast between Punta Battistone, Capo Tre Monti, and Baia Mucchi-bianchi.

Water.—A small stream runs into the head of the gulf, and water can be procured on the western side.

Capo Ferro.—From Capo Tre Monti the coast, trending in a general easterly direction to Capo Ferro, forms several coves and projecting points. This cape, the northeastern extremity of Sardinia, is moderately high, rugged, and bold on its northeastern side, and of a dark, iron red color, with a table summit. Some rocks above, and others under water, lie off its northeastern part, but not exceeding 200 yards from the shore; others to the southeastward of the cape at about 400 yards from the shore.

Light.—On the hill, at the northeastern part of Capo Ferro, is a yellow circular tower, 59 feet in height, and surmounting a dwelling, which exhibits, at an elevation of 171 feet above the sea, a fixed and flashing white light, visible 16 miles.

From a window in the same tower a fixed red light is exhibited at an elevation of 140 feet above the sea, which is visible 5 miles. (For arc of visibility, see Light List and Chart.)

Signal station.—Semaphore.—About 400 yards east-southeastward of Capo Ferro Lighthouse is a semaphore, 151 feet above the sea, with which vessels can communicate: the semaphore is worked

both by day and night. Signals respecting submarine vessels are made here.

Cala Liscia di Vacca, immediately westward of Capo Ferro, is more than $\frac{1}{2}$ mile deep and nearly the same broad, with from 7 to 14 fathoms water; it has good holding ground and affords shelter from all winds for small vessels. Cappuccini, a small islet, lies on the northern side of the entrance of the cove, about $\frac{1}{4}$ mile from the land of Capo Ferro, and midway between there is a depth of $3\frac{1}{4}$ fathoms, with rocks on both sides of the channel.

Anchorage.—The anchorage, southward of the islet, is in about 10 fathoms water, over weed, 400 yards distant from the shore; off the southern side of the cove is a small rock and shoal, lying 300 yards from the shore.

Isola Biscie, lying about $\frac{1}{4}$ mile northward of Capo Ferro, is about $\frac{1}{2}$ mile in length in a northwesterly and southeasterly direction, and 600 yards in breadth, low, barren, with several rocks around it, the largest being on the southwestern side. A group of rocks lies 800 yards northward of Isola Biscie, and in the channel between there is $3\frac{1}{4}$ fathoms water.

The channel formed by Capo Ferro and Isola Biscie is clear and deep, having a depth of 13 fathoms in mid-channel, and is frequently used by vessels from the ports on the east coast of Sardinia to Maddalena and vice versa. See Caution and Prohibited passage, p. 401.)

Secca delle Biscie, nearly $1\frac{1}{2}$ miles northeastward of the center of Isola Biscie, consists of four rocky heads in a space about 700 yards in extent, in an easterly and westerly direction; on the western head the least depth is $2\frac{1}{2}$ fathoms, and on the eastern $3\frac{1}{4}$ fathoms; there are 9 and 12 fathoms water around, and, between it and the island, depths of from 15 to 22 fathoms. From the least water, on the western head, Capo Ferro Lighthouse bears 193° , distant nearly 2 miles. The fixed red light on Capo Ferro shows over this shoal.

Secca Pecora, about 200 yards in extent, and having $2\frac{1}{4}$ fathoms water over it, lies $\frac{1}{2}$ mile 316° from the northwestern point of Isola Biscie. A rocky patch about 100 yards in extent, and having $3\frac{1}{4}$ fathoms water over it, lies 600 yards 283° from the same point. The description of the coast of Sardinia is continued on page 408.

Intermediate Islands (Arcipelago della Maddalena).—The several islands lying off the northeast coast of Sardinia, and between it and Corsica, are known as the Intermediates (Arcipelago della Maddalena); they are composed of red granite, and form, with the Sardinia coast, secure shelter for any class of vessels.

Isola Razzoli, the northwestern of the group, is 1.3 miles in length in a northwestern and southeastern direction, and 1,600 yards in breadth, rocky and arid; Monte Cappello, near the southern end, is 213 feet above the sea. There are two coves, one on the east, the

other on the west, but they are only suitable for fishing boats. Two small islets named Callot and some sunken rocks lie about 200 yards off the northern end; and Secca di Razzoli, having $4\frac{1}{2}$ fathoms water over it, lies $\frac{1}{2}$ miles 310° from the lighthouse.

Light.—On a ridge 200 yards within the northwestern point of Isola Razzoli, on the southern side of the eastern entrance to Bonifacio Strait, is a tower, painted in black and white horizontal bands, 89 feet in height, with a square base, which exhibits, at an elevation of 282 feet above the sea, an occulting white light with a red sector. The sector shows over Secca Lavezzi; the white light is visible 18 miles, and the red light 15 miles. (For arc of visibility and sector, see Light List and Chart.) (Reported irregular, 1912.)

Isola Santa Maria, 161 feet above the sea, and cultivated, is separated from the eastern side of Razzoli by a narrow channel only 100 yards wide and 3 feet deep; the two islands, of nearly equal extent, appear as one. The northern end of Santa Maria is nearly united to Isolotto La Presa, which is 164 feet above the sea, and about $\frac{1}{2}$ mile in length, in an east and west direction; it forms, with Santa Maria, Baia Baccica, open to the westward, with 12 to 18 fathoms water in the middle, sheltered from all winds but those from the northwest, and terminating in a beach.

There is a small cove with a beach on the southeast coast, off which, in case of necessity, small vessels may obtain shelter with off-shore winds. A rocky patch with 2 feet water over it lies about 300 yards off the eastern point of the cove, and other shoals are reported to exist, so great caution is necessary until a proper examination has been made; several rocks above water lie off the western point.

Isola Santa Maria—Light.—An occulting white light is shown from a lighthouse erected on Punta Filetto, the eastern extremity of Isola Santa Maria. The lighthouse is painted black and white in horizontal bands.

Isola Budelli, lying southwestward of Razzoli and Santa Maria Islands, is barren, and of about the same extent as the others; Monte Budelli, on the southern side, is 285 feet above the sea. It forms, with the southern coasts of the other two islands, a curved channel named Canaletto, $\frac{1}{4}$ mile wide, but the southeastern entrance to it is obstructed by a group of rocks named Cecca di Morto, leaving only a boat passage between them and Isola Budelli.

Beacon.—There is a white masonry beacon on the southern point of Isola Budelli. This beacon, in conjunction with one on Guardia dell Turco (Isola della Maddalena), marks the limit of the Sardinian tunny fisheries.

Secca Budelli, with a depth of $3\frac{1}{4}$ fathoms, lies southwestward of Punta Cisterna, the western extremity of Isola Budelli, distant 1,200 yards.

Isolotti Corcelli, Barrettini, Barrettinelli.—The island of Santa Maria forms, with the northern extremity of Maddalena, a passage $2\frac{1}{2}$ miles wide, which is obstructed by four large and some smaller islets; the three northern islets are named Corcelli, the western 102 feet above the sea; the center Barrettini (131 feet), and the southern Barrettinelli.

Passo di Santa Maria, the channel between Santa Maria and the islets, is $\frac{1}{2}$ mile wide, and has general depths of from 9 to 13 fathoms, but nearly in mid-channel is Secca Barrettini, about 100 yards in extent, and having $3\frac{1}{2}$ fathoms water over it. From the shoal the southwestern extremity of Isolotto Corcelli bears 130° , distant 700 yards; its position is generally perceptible from the strong current ripple near it. Vessels should keep on the western side of mid-channel.

Passo di Barrettini (Barrettinelli), the other channel between Isolotto Barrettinelli and Maddalena, is $\frac{1}{2}$ mile wide, and, with the exception of a patch with 9 fathoms water over it, has depths of from 26 to 33 fathoms. By keeping in mid-channel, there is no difficulty in passing through the channel.

The channel between Corcelli and Barrettini Islets is 400 yards in width, between the 5-fathom curve, and has depths of from 10 to 13 fathoms.

Isola Spargi, $1\frac{1}{2}$ miles to the southward of Budelli, and about the same distance from the coast of Sardinia, is nearly circular, $1\frac{1}{2}$ miles in diameter, and more populous than any of the others; Guardia Preposti, the highest point near the southern end, is 509 feet above the sea. On the southwestern side are two coves named Cala d'Arga and Cala Corsara.

A rocky shoal, with $4\frac{3}{4}$ fathoms water over it, lies $\frac{1}{2}$ mile eastward of Punta Bonifazzina, the northeastern point of the island.

Washington Rock, 100 yards in diameter, and having a depth of $3\frac{1}{4}$ fathoms, lies with Punta Bonifazzina bearing 124° , distant 1 mile.

Secca Corsara, with $1\frac{1}{2}$ fathoms water over it, and steep-to, lies $\frac{1}{2}$ mile from the southwestern end of the island.

Buoy.—A square buoy with a pyramidal iron framework surmounted by a cylindrical topmark is moored on the southern side of the rock.

Clearing mark.—The southwestern point of Isola di Santo Stefano in range with Punta Sardegna, bearing 123° , leads southward of Secca Corsara.

Isola Spargiotto, 157 feet above the sea, lies about 800 yards westward of Spargi, and the channel between being foul, should not be navigated; Spargiottello, a small rock, is situated on the northwestern side of Spargiotto, and a rock, with $1\frac{1}{2}$ fathoms water

over it, lies 200 yards westward of the islet, and one with a similar depth, at the same distance southwestward of it.

Channels—Caution.—Between Spargi and Maddalena there is a clear channel 1,600 yards in width, with depths of from 21 to 23 fathoms, which is used by vessels bound to and from Maddalena, and between Spargi and the coast of Sardinia a channel, 1 mile wide, has depths of from 21 to 25 fathoms in the center. Vessels passing through the various channels surrounding Isola Maddalena are obliged to hoist their national flag. No dependence should be placed on the beacons or buoys.

Passage prohibited.—Merchant vessels are prohibited from entering the area contained within the limits described below, unless bound for any port within those limits:

(a) By a line joining Capo Ferro Semaphore and the summit of the southwestern of Isolotti Monaci.

(b) By a line joining the summit of the southwestern of Isolotti Monaci to the northernmost extremity of the largest of Isolotti Barrettini.

(c) By a line joining the northwestern islet of Isolotti Barrettini to the northern extremity of Isola Spargiotto.

(d) By a line joining the northern extremity of Spargiotto and Secca Corsara Buoy.

(e) By a line joining Secca Corsara Buoy and the northern extremity of Punta Sardegna.

(f) By the coastline between Punta Sardegna and Capo Ferro Semaphore.

The prohibited area is shown on the chart by pecked lines.

Isola della Maddalena, rather less than 1 mile eastward of Spargi, and the largest of the group, is rocky and its shores is fringed with rocks. Guardia Vecchia, near the southwestern end, is 499 feet above the sea, and the highest point of the island, $\frac{1}{4}$ mile farther northward, 522 feet. Punta Marginetto, the northern extremity of the island, is low and surrounded by rocks at the distance of 300 yards, and between it and Isolotto Barrettinelli is the pass, already mentioned.

Isolotto Giardinelli, on the east coast, $2\frac{1}{2}$ miles southward of Punta Marginetto, is low, nearly circular, $\frac{1}{2}$ mile in diameter, and close to the shore. It is fringed with rocks and shoals (more especially round the eastern shore) which extend off more than 400 yards. Westward of the islet and between it and some rocks off Maddalena is La Peticchia, a narrow inlet $\frac{1}{2}$ mile deep, open to the northeastward, having depths from 3 to 7 fathoms.

Passo della Moneta, about 700 yards in width, shallow, and full of rocks is between the southeastern point of Isolotto Giardinelli and

Isola Capera, and from Punta Moneta, the southeastern extremity of Maddalena, a breakwater, with an opening 82 feet in width, crossed by a swing bridge, extends to Punta Puntarella in Caprera and affords shelter to the anchorage off the naval establishment.

Guardia del Turco—Beacon.—On Guardia del Turco, the northern summit of Isola della Maddalena, 276 feet high, is a white masonry beacon. A line drawn through this beacon and a similar one on the southern extremity of Isola Budelli marks the northern territorial limit of the tunny fishery between Sardinia and Corsica.

Isolotto Chiesa, about 1 mile westward of Punta Moneta, is about 300 yards in diameter and 52 feet above the sea. From its southeastern end a mole extends in a south and southwest direction for a distance of 300 yards. The eastern side of the island is connected to the main island by a bridge.

Breakwater—Lights.—A breakwater has been constructed westward of Chiesa Bay and two fixed red lights have been erected on the outer extremity on the bearings: Signal mast, $1^{\circ} 30'$, distant 147 yards; two lights on the breakwater on the southern end of Chiesa Island, 121° .

Lights.—A fixed red light is exhibited, at an elevation of 16 feet above the sea near the port office, Cala Gavetta.

A fixed white and a fixed red light are exhibited, at an elevation of 26 and 33 feet above the sea, respectively, 22 yards westward of the head of the landing pier, Piazza Umberto. A fixed white light is exhibited, at an elevation of 75 feet above the sea, from the tower of the commandant's house. These lights indicate the channel between Secca del Parau and Isolotto la Paura.

On the southwestern extremity of the mole at Isolotto Chiesa two fixed white lights, placed vertically 6 feet apart, are exhibited, at an elevation of 33 feet above the sea, from an iron column 28 feet high and are visible 2 miles.

A fixed green light, exhibited from a wooden pole, has been established on Isolotto Chiesa, shown from a wooden pole erected near the summit of the islet. (See Light List.)

A fixed light is shown from the end of the Hospital Pier. The light formerly shown from the window of the Marine Hospital has been discontinued.

Range lights.—Two fixed green electric lights are shown, one from a flagstaff near the northern angle of Fort Camicio, and the other from a wooden post 93 yards 175° from it. These two lights when in range 355° lead through Rada de Santo Stephano, clear of the mooring buoys.

On the western side of the entrance to Cala Camicia a fixed red light is exhibited, 12 feet above the sea, from a staff on the coal

wharf, and from the end of the landing pier on the eastern side a fixed green light is exhibited, at an elevation of 22 feet above the sea.

Radio station.—There is a radio station on Isolotto Chiesa which is always open to the general public. The call letters are M B V.

Beacon.—About 200 yards southwestward of the light-column on the mole is a stone beacon, painted white, about 7 feet high, marking the southern side of the channel between the mole and Isolo Santo Stefano. This channel is only suitable for vessels of light draft, the least water being 2 fathoms.

Scoglio Nasse—Beacon.—On Scoglio Nasse, a rock above water, lying 150 yards northward of the northeastern extremity of Santo Stefano, is a white mast surmounted by a black flag; the rock is also white.

Buoys.—A black iron conical buoy, surmounted by a staff and cone, base downward, marked "Isola Chiesa" in white, is moored 160 yards westward of the mole end, and between the depths are less than 6 feet.

A white barrel-shaped buoy is moored on the northern side of a 1-fathom shoal, which lies about 300 yards southwestward of the light on the western side of the entrance to Cala Camicia.

Two buoys lie east-northeastward of Scoglio Nasse; one, distant 100 yards, is a pole surmounted with a sphere and a half sphere, and the other, a red conical buoy, surmounted by a cylinder, with "Nasse" on it in white, marks the edge of the shoal water, distant 160 yards.

A rock, with 6 feet of water over it, lies 50 yards southward of the end of the Hospital Pier.

A shoal, with $4\frac{1}{2}$ fathoms water over it, situated about 600 yards southwestward of the coal wharves, is marked on its southern side by a bell-buoy.

About 200 yards northward of this shoal is another, on which the depth is $2\frac{1}{2}$ fathoms; it is marked by a buoy, but is within the line of prohibited anchorage.

Naval establishment.—Between Punta Moneta and Isolotto Chiesa are two small coves, named Cala Camicia and Cala Camiciotto, and northward of the island is Cala Chiesa; along the shores of these three coves is the naval establishment, with barracks, coal stores, magazines, marine hospital, etc.

Dock.—There is a floating dock for torpedo boats only.

Repairs.—Small repairs to machinery can be executed; there are floating sheers lifting 140, 20, and 15 tons.

Prohibited anchorage.—Anchorage is prohibited within the area, bounded on the northward by the south coast of Isola Maddalena, and to the southward by a line joining roughly the western end of Piazza Umberto, the extremity of Isolotto Chiesa Mole, Punta

Moneta, and the swing bridge. A line of buoys marks the limit, which is shown by a pecked line on the chart.

Mooring buoys.—There are two mooring buoys in Cala Chiesa.

Rada di Maddalena, between Maddalena Town and Isola Santo Stefano, is exposed from the westward, from which quarter the wind blows with the greatest force. Vessels that can not enter Cala Chiesa, anchor to the southeastward of the town in 9 or 11 fathoms water, and make a cable fast to the shore at the entrance to the bay. On the eastern side of Isola Santo Stefano is Rada di Santo Stefano.

Town.—The town of Maddalena is situated on the western side of Cala Chiesa; the population, numbering about 8,033, are mostly seafaring.

Communication.—Steamers run twice weekly between Civita-Vecchia and Golfo Aranci; weekly to Porto Torres, Leghorn, and Genoa; and fortnightly to Cagliari; telegraphic communication with all parts. The telegraph office is open till midnight.

Coal and supplies.—About 20,000 tons of coal are kept in Government hands, but none for sale; water is obtained by distillation, and about 2,200 tons kept stored.

Signal station—Semaphore.—There is a semaphore on Guardia Vecchia, over the town of Maddalena, 499 feet above the sea, and near the most elevated part of the island; the hill is surmounted by a fort. The semaphore is worked both by day and night. Signals respecting submarine vessels are made here.

Coast.—The coast between the town of Maddalena and Forte Tegge, $\frac{3}{4}$ mile westward, is bordered with rocks and shoals extending for a distance of 500 yards: two islets of white color, about 20 feet above the sea and 200 yards apart, lie a short distance southward of the fort.

Secca di Forte Tegge, with $1\frac{1}{2}$ fathoms water over it, is situated 700 yards 186° from the fort.

Beacons and buoys.—A white truncated pyramidal masonry beacon 10 feet high marks an isolated shoal, 800 yards westward of Forte Tegge, and another is placed on the shoal to the southward of White Rock. A white iron conical buoy, with a staff and cylinder, and marked "Tegge" in black, marks the southern extremity of Secca di Forte Tegge.

A similar buoy, but marked "Punta Nera" in black, is moored on the southern limit of the shoal to the southward of Punta Nera, the next point to the eastward of Forte Tegge.

Between Secca di Forte Tegge and the town of Maddalena are several beacons and buoys, marking the channel.

(For description of Secca di Mezzo Passo and Secca del Parau, see p. 395.)

West coast.—Punta Testicchiole is $1\frac{1}{2}$ miles northward of Forte Tegge, and between is Cala Francese, only suitable for small vessels. The west coast of Maddalena to Punta Marginetto, the northern extremity of the island, a distance of $2\frac{3}{4}$ miles, is fringed by small islets or rocks, some of which are more than 400 yards from the shore. A low salient point, named Abbatoggia, nearly 1 mile south-westward of Punta Marginetto, forms with the latter the entrance to Cala Stagnotorto, an inlet about $\frac{3}{4}$ mile deep, seldom frequented, with 20 fathoms water at the entrance and 4 fathoms near its head.

Isola Caprera, the eastern of the group, lying close to the south-eastern side of Maddalena, is somewhat less in extent, and has a deeply indented coast line. It is also the highest of the group, Punta Tejalone (Teialone) in the center attaining an elevation of 696 feet above the sea. It is more fertile than Maddalena, and has copious springs; upon the western side is the unpretending dwelling and farm of the proprietor. This island was given to Gen. Garibaldi by the King of Italy.

Cala Portese, on the southeastern side of Caprera, is about 1,400 yards deep and terminates in a sandy beach; it has depths of 20 fathoms at the entrance, shoaling to about 2 fathoms at the head, but being open to the northeastward is seldom visited. It is formed by a piece of irregular forked land, at the eastern end of which is Isolotto Pecora, 49 feet high, with a white obelisk on the summit and a large rock eastward of it. Isolotto Pecora lies $1\frac{1}{2}$ miles northwestward of Isola Biscie, the channel between having from 14 to 30 fathoms water.

Punta Rossa, the southern extremity of Caprera, is the termination of a low, narrow prong extending $\frac{3}{4}$ mile to the southward. There is a battery on Punta Rossa, and sheds along the western coast facing Isolotto Porco.

Secca di Punta Rossa, with 3 feet water over it, extends nearly 400 yards southwestward of the point, and $\frac{3}{4}$ mile to the southwestward of Punta Rossa is Secca Tre Monti.

Buoy.—A white buoy, surmounted by a globe, is moored near the extremity of Secca di Punta Rossa.

Landing is prohibited in the vicinity of Punta Rossa Battery.

Isolotto Porco, 82 feet high, and nearly $\frac{1}{2}$ mile to the northwestward of Punta Rossa, has a white hut on the summit and a white beacon at the northern extremity; there is good anchorage on the eastern side of the islet for small vessels in 5 or 6 fathoms water.

Monte Fico, the southwestern extremity of Caprera, is 233 feet above the sea and apparently isolated. Porto Palma, on the eastern side of Monte Fico, is nearly $\frac{1}{2}$ mile deep and 600 yards wide; it has from 9 to 16 fathoms water in the entrance shoaling to $3\frac{1}{4}$ fathoms

at the head, but in the middle of the entrance there is a shoal with $4\frac{1}{2}$ fathoms water over it, and about 100 yards south-southeastward of this shoal is another with only 4 feet over it. Although open to the southward it affords shelter for small vessels from all winds; some rocks lie 200 yards off its eastern entrance point.

Beacon.—A white stone beacon, surmounted by a globe, is situated on the small isolated rock off the southwest corner of Punta Fico.

Buoy.—A shoal extending about 200 yards southwestward of Punta Fico, the southwestern extremity of Caprera, is marked by a square black buoy, surmounted by a castle and cone, vertex upward.

Passo della Moneta.—Caprera is separated from the eastern side of Maddalena by Passo della Moneta, which is about 700 yards wide, shallow, with several rocks, and only suitable for small vessels. The western coast of Caprera is low, scattered with rocks, and has several coves, which are frequented by fishing boats; it trends 4 miles in a north-northeasterly direction to Punta Galera.

Beacons and buoys.—The channel is marked by beacons and buoys.

Directions.—Only small vessels can pass through Passo della Moneta, and when intending to do so the signal I F R of the International Code should be made two hours previously to the signal station at Guardia Vecchia, that the necessary arrangements may be made for opening the swing bridge.

Isolotti Monaci, a small group, only a little above the sea, and steep-to on all sides, lie 1.3 miles eastward from Punta Coticcio (Caprera Island), with 38 fathoms water in the channel between and from 20 to 31 fathoms between the islets and Secca dei Monaci. The red light of Cape Ferro shows over the islets. Vessels of all classes may pass through either channel, taking care to avoid Secca dei Monaci, the marks for which are given below. (See p. — for Prohibited passage.)

Secca dei Monaci, situated 1.1 miles eastward from the northern extremity of Isolotti Monaci, is a rocky danger about 200 yards in extent, with $1\frac{1}{2}$ fathoms over it, steep-to, with about 20 fathoms close around. The red light of Cape Ferro shows over the shoal, and the flashing white light of Isola Tavolara is reported to be visible from its neighborhood.

Clearing marks.—Guardia del Turco Beacon, on the northern summit of Maddalena, well open of the northern extremity of Caprera, bearing 290° , leads to the northward of the shoal, and Capo Ferro Lighthouse in range with the eastern extremity of Isola Biscie, bearing 201° , leads to the eastward of the shoal, but will lead over Secca delle Biscie if continued on too far to the southward.

Isola Santo Stefano, about 600 yards southward of Maddalena, is nearly 4 miles in circumference; at the northern end Poggio Tondo

is 266 feet, and at the southern end Monte Guardia Moro 299 feet above the sea. On the southwestern side Cala di Villamarina, a small cove which recedes 600 yards to the northward, is $\frac{1}{4}$ mile wide and affords shelter to small vessels, which moor with a cable to the shore.

A small fort, named San Giorgio, stands on a height on the western side of the cove, and 300 yards southward of it is Casa la Torre, a square tower with a building near it. From the eastern side of the island no dangers extend for a distance of more than 200 yards, but on the northwest coast the 5-fathom curve is about double that distance from the shore; from the northern end shoals extend across to Cala Chiesa.

Nearly 600 yards westward from Isolotto la Paura, on the western side of Santo Stefano, is Secca del Parau, described on page 395; the channel between the islet and the rocks has from 6 to 8 fathoms water. (For range lights through this channel see p. 402.)

Buoys.—Two small white cask buoys mark the edge of the shoal ground extending from the northwest coast of the island, one about 400 yards northeastward of Isolotto la Paura, and the other about 400 yards southwestward of the northwestern point of the island.

Rada di Santo Stefano, between Punta Coda and Punta Stagnali (Caprera) on the east, and Punta Santo Stefano and Punta Sassu (Santo Stefano) on the west, is a space nearly 1 mile square with depths of from 18 to 20 fathoms over a bottom of sand and weeds.

Mooring buoys.—There are 13 mooring buoys; their positions will be best seen by reference to the chart.

Anchorage.—Large vessels may anchor along the whole eastern coast of Santo Stefano; small vessels, during westerly winds, anchor at the head of the road, near the naval establishment, in depths of from $3\frac{1}{2}$ to 7 fathoms; it is stated that the holding ground is not good, that heavy squalls are frequent, and at times so strong as to cause vessels to drag their anchors; mooring buoys are placed for the use of the Italian naval vessels.

Estuario della Maddalena.—The foregoing islands form, with the coast of Sardinia, a tortuous channel, having very irregular depths, leading into Bonifacio Strait, and where, on either side, are several good anchorages. Though the narrowest parts of this channel average only about $\frac{1}{2}$ mile in breadth, being marked by beacons and buoys, it may be navigated with safety.

Passage prohibited—Caution.—See page 401.

Fishing is prohibited within the area bounded on the eastward by a line joining Isoli Pecora and Biscie and Capo Ferro, and on the westward by a line joining Isole Cavalli, Secca Corsara (Isola Spargi), and Cala dell' Inferno (Maddalena).

East coast of Sardinia—Coast.—From Capo Ferro the coast runs southeastward for about 700 yards, and then forms a small bight with a cove and beach at its head. There is anchorage for small vessels, with westerly winds, in 4 fathoms of water off the cove; coasting vessels use this anchorage when unable to proceed westward.

Shoal water extends nearly 400 yards northeastward from the northern point of the bight.

Secca del Cervo, situated $\frac{1}{2}$ mile northeastward of the north entrance point of Porto Cervo, and on the southern side of the bight just described, is a rocky shoal extending 600 yards in a northeasterly and southwesterly direction and nearly 400 yards in breadth, with depths of from 7 to 18 feet over it. It is $\frac{1}{4}$ mile from the coast, and there is a narrow channel about 200 yards wide with depths of from 4 to 6 fathoms in it between the shoal and the shoal water off the coast.

Clearing mark.—Punta Tejalone, the summit of Caprera, a little open to the northward of the northeastern side of Isola Biscie, bearing 318° , leads to the eastward of Secca del Cervo.

Porto Cervo, a small port, about $1\frac{1}{4}$ miles southward of Capo Ferro, extends to the westward for a distance of $\frac{1}{2}$ mile and is 400 yards in breadth but difficult of access for any but small vessels, the entrance being only 100 yards wide. It is sheltered from all winds, but as the entrance is open to the northeastward a swell sets in with winds from that quarter. There are depths of from 6 to 8 fathoms in the outer parts and 3 fathoms halfway in, over mud bottom.

Water may be obtained from a small stream.

Capo Libani, 3 miles southeastward of Capo Ferro, is barren and red and commanded by elevated land named Monte Zoppo, 285 feet above the sea. Golfo Pevero, just to the westward of the cape, is 1,600 yards wide at entrance and 1,200 yards deep, open to the northeastward, with some small islets and rocks skirting the shore. With offshore winds, it is frequented by coasters, which anchor in 6 or 7 fathoms water.

Close to the cape is an islet and some rocks of the same color as the cape, which, with those a little to the northward, shelter the bays from easterly winds.

Isole dei Libani.—At $\frac{1}{2}$ mile to the northeastward of the cape is an island, 82 feet above the sea, and of a dark color, surrounded with islets and rocks. Passo delle Galere, the passage between the islets and the land, is 600 yards wide and 5 fathoms deep in the middle.

Monte Turrita, 1,381 feet high, is $2\frac{1}{4}$ miles west-southwestward of Capo Libani; it will be known by the rocky inclination of its summit, which is a good mark for this part of the coast.

Golfo di Congianus lies between Capo Libani, on the north, and Capo Figari, on the south; it comprises the Bays of Volpe, Cognena, and Marinella, and the islands now described.

The depths are from 50 fathoms, at the entrance of the gulf, to 20 fathoms within the bays, the bottom chiefly of sand and mud.

Isolotti Poveri.—Punta Capaccio is 1.1 miles southward of Capo Libani, and $\frac{1}{2}$ mile southeastward of it are 3 small islets and 16 rocky heads, covering an extent of $\frac{3}{4}$ mile in a northeasterly and southwesterly direction, with a breadth of about $\frac{1}{2}$ mile; they form a channel with the coast about 800 yards wide and midway 10 fathoms deep; but, as the passage is narrowed by reefs on both sides, it should not be used unless in case of necessity. The group is fringed with reefs on the northern side.

Isola Mortorio, the highest of a group of islands, lies about 3 miles southeastward of Capo Libani, is of an irregular figure, about 3 miles in circuit, 249 feet above the sea at its northeastern end, and steep to at its extremities, but rocky in the small bays which it forms. Two black rocks, steep to, named Mortoriotto (Testa di Cane), lie nearly $\frac{1}{2}$ mile northeastward of it, with 26 fathoms water in mid-channel between. An islet named Camize lies about 700 yards westward of Mortorio, with two rocks on its northern side; the channel between Camize and Mortorio has depths of from 8 to 10 fathoms.

Isola Soffi, 1 mile westward of Mortorio, and of equal extent, is 105 feet above the sea at its northeastern end, and $1\frac{1}{4}$ miles distant from the coast; two islets, Le Camere, 63 and 86 feet high, nearly united, surrounded by rocks and shallow water, lie at its northeastern end. Between the rocks and Isola Camize there are 6 fathoms water.

Anchorage.—**Cala Volpe**, 3 miles south-southwestward of Capo Libani, is 1 mile wide, and $\frac{3}{4}$ mile deep. In the bay there are two coves with beaches; the northern is $\frac{1}{2}$ mile deep, 400 yards wide, open to the south, and affords shelter for small vessels in from $1\frac{1}{4}$ to $2\frac{1}{4}$ fathoms water.

There is also anchorage in the center of the bay, in depths of from $7\frac{1}{2}$ to 11 fathoms, over mud bottom, partially sheltered from the eastward of the off-lying islands. It is sometimes named Ancoraggio di Soffi, from the island of the same name.

Golfo Cognena.—Punta Ligata, or Liscia Ruja, which forms the southern extremity of Cala Volpe, is low, projects eastward, and is skirted with rocks at about 200 yards distance. Punta Volpe, 2 miles southeastward of Punta Digata, is the termination of a small peninsula fringed with rocks to a distance of nearly 400 yards. The intermediate coast forms Golfo Cognena, in the southern part of which an inlet, Porto Cognena, extends about $1\frac{1}{2}$ miles to the southwestward. About $1\frac{1}{2}$ miles westward of the head of Porto Cognena is Monte Congianus, a peak 2,128 feet high.

In the outer part of the inlet there are from 2 to 4 fathoms water, but all the inner part is shallow, the depths varying from 4 to 6 feet. In case of necessity, during fine weather, a vessel may anchor in this gulf in any convenient depth. Two circular coves, with steep sides, about 400 yards in diameter, are situated between the entrance of the inlet and Punta Volpe, and are used by small coasting vessels and fishing boats. The western has a depth of 3 fathoms; Porto Rotondo, that nearest the point, has a depth of $1\frac{1}{2}$ fathoms, is $\frac{1}{2}$ mile distant from the former, and is sheltered from all winds.

Golfo Marinella.—Punta Canisone, $1\frac{1}{2}$ miles southeastward of Punta Volpe, has a rocky shoal extending nearly $\frac{1}{2}$ mile northward of it; the intermediate coast forms Golfo Marinella, 2 miles deep, and open to the northeastward. Cala Sabina and Cala Marinella Nuova, two rocky coves, are on the southeastern side of the bay, and another, named Marinella Vecchia, is situated at its head. The railroad skirts the south shore of Golfo Marinella.

Communication.—There is a railroad station at Aranci, about 4 miles to the eastward, in Baia degli Aranci, and telegraphic communication from Marinella Vecchia.

Submarine telegraph cable.—A telegraph cable is laid between Marinella Vecchia and the west coast of Italy.

Beacons with balls point out the direction of the cable, and mariners are cautioned not to anchor in the vicinity.

Coast.—The coast between Canisone and Spada Points, a distance of 2 miles, is foul, and should not be approached nearer than 600 yards.

Capo Figari, about $3\frac{1}{2}$ miles southeastward of Punta Canisone, is a rocky head, and the termination of a white peninsula projecting in an east-southeasterly direction for a distance of nearly 2 miles. The cliffs on its northern face are of a red color, and the hill above it (in which there is a great break) is covered with verdure. The land in the interior is a continued chain of high mountains, descending with many ravines toward the indented shore.

Capo Figari is about 9 miles from Capo Libani, the intermediate coast forming the deep bight, Golfo di Congianus, already described. During winds from the northwest quarter heavy squalls and eddies are experienced near the cape.

Signal station—Semaphore.—A semaphore, with which vessels can communicate, is established at Capo Figari at an elevation of 1,115 feet above the sea. Signals respecting submarine vessels are made here.

Golfo di Terranova.—Punta Timone, the northeastern extremity of Isola Tavalora, lies 3.3 miles 142° from Capo Figari, and between the points is the entrance to Golfo di Terranova, which extends

nearly 10 miles westward, to the port and town of the same name. There is a depth of about 30 fathoms at the entrance, and within general depths of 18 and 20 fathoms, over mud.

Firing ground—Lightbuoys—Caution.—Annual firing practice for Italian naval vessels is carried out in Golfo di Terranova. The water area is situated between Punta Timone, Capo Ceraso, and Isolotto di Figarello; it is in the form of a polygon, and the angles are marked by buoys exhibiting fixed white lights, which are visible 2 miles.

Vessels are forbidden to enter the polygon, and the buoys should be left on the port hand when entering the gulf and on the starboard hand when leaving.

Buoys are also laid out annually off Punta Figlio; the eastern one, which exhibits a fixed white light, lies $1\frac{1}{4}$ miles 52° from Isolotto Bocca Light. Vessels must pass southward of these buoys.

Submarine vessels—Caution.—Mariners are cautioned that exercises with submarines are frequently carried out in the approaches to Maddalena, at Baia degli Aranci, and in adjacent areas.

When the submarines are submerged the escorting torpedo craft or tugs will hoist a square red flag at the masthead.

A similar flag will be hoisted from the semaphores of Guardia Vecchia (Maddalena), Capo Ferro, and Capo Figari, according to the locality in which the exercises are being carried out. The above flag may be lowered at any of the foregoing semaphore stations to signal to a vessel in sight, but it will be immediately rehoisted on the appearance of another vessel.

All vessels in sight of the escorting vessels should pay strict attention to any signals made to them by the International Code. Such signals will be made to indicate the course, etc., to be steered in order to avoid collision, and may in urgent cases be accompanied by the firing of a gun.

When navigating in the above localities mariners are specially warned to look out for the periscopes of the submarines. In ordinary exercises the periscope of a submarine is surmounted by a short mast with a metal pennant.

Baia degli Aranci.—On the southern side of Capo Figari, distant 300 yards from the coast, is the high, pyramidal islet of Figarello, 426 feet above the sea, covered with brambles, and steep to on its eastern side. Midway between the islet and coast there is 4 fathoms water. Cala Moresca, northward of the islet, affords excellent shelter for coasters from all winds, and will accommodate five or six such small vessels.

Between Isolotto di Figarello and Punta Lepre, 2.3 miles westward, is formed Baia degli Aranci, secure, commodious, and sheltered

from all winds. Between Isolotto di Figarello and Punta Lepre there are depths of from 20 to 26 fathoms, diminishing gradually toward the shore.

Landmarks.—Monte Rotondo (Canale Torto), 302 feet high, lies about $\frac{3}{4}$ mile northwestward from the head of the bay; there is a conspicuous ruined white house near the summit. There is another conspicuous white house, about $\frac{3}{4}$ mile southwestward of Monte Rotondo, and two conspicuous white houses very close together about $\frac{3}{4}$ mile east-southeastward of Monte Rotondo. The railroad station (close to the shore) is painted yellow, has a red roof, and is surrounded by trees; a conspicuous white house, with a red roof, surmounted by an obelisk, is situated about 200 yards northward of the railroad station. A conspicuous white house is situated about 800 yards southward of the station.

Mole.—A mole extends in a southwesterly direction from the shore for a distance of 240 yards from the northeastern side of the bay. There is a depth of 19 feet near the quay within the mole.

Lights.—From an iron post, 18 feet high, on the molehead, a fixed red light is exhibited at an elevation of 26 feet above the sea, and in clear weather it is visible from a distance of 4 miles. Reported to be visible only 1 mile.

Two fixed white lantern lights are shown on the mole embankments. (See Light List.)

Isolotto di Figarello—Light.—A flashing white light, visible 13 miles, is shown from a tower with a lantern support, 22 feet high, erected near the center of the Isolotto di Figarello; the lantern is elevated 236 feet above high water. (See Light List.)

Rock and beacon.—A rock, on which is a white beacon 5 feet in height, lies about $\frac{1}{2}$ mile 302° from the light on the head of the mole in Baia degli Aranci.

Mooring buoys.—There are two mooring buoys on the southern side of the mole and four mooring buoys and a small buoy on the northern side of the mole.

Anchorage.—A good berth for a large vessel is nearly 1 mile to the northwestward of Isolotto di Figarello, and 700 yards from the shore of the peninsula, with the southern point of Isolotto di Figarello bearing 122° and the lighthouse 50° . Small vessels anchor off the beach at the head of the bay. Westerly winds blow with the greatest force and are the most inconvenient.

Communication.—There is a daily steamer to Civita Vecchia, and mails from Italy arrive daily; a steamer every week to Leghorn, Genoa, and to Cagliari, calling at intermediate ports; twice every week to Maddalena; railroad communication with Terranova and Cagliari, and telegraphic communication.

Supplies of fresh provisions in small quantities may be obtained, but large supplies must be ordered from Cagliari or Terranova, and all water is brought by train.

Quarantine is strictly enforced; the health office is close to the mole.

Coast.—From Punta Lepre the coast has a south-southwesterly direction for $2\frac{1}{2}$ miles to Punta Figlio, and at $\frac{1}{2}$ mile from Punta Lepre is Isolotto Porri, low, rocky, and surmounted by verdure; a shoal with 11 feet water over it lies 1,100 yards south-southwestward of the islet, and about 800 yards from the shore.

Buoy.—A red buoy is moored on the shoal off Isolotto Porri during the Italian annual firing practice.

Porto Terranova.—The land in the immediate vicinity of the port of Terranova is low, marshy, and unhealthful. The entrance to this port, $4\frac{1}{2}$ miles southwestward of Isolotto di Figarello, is about 200 yards wide, but obstructed by rocks and sand. A channel about $\frac{1}{2}$ mile in length, 100 yards in width, leads into Porto Terranova, and within the entrance the port opens out to about 1 mile in breadth and is $2\frac{1}{2}$ miles in length in a westerly direction; for a distance of $1\frac{1}{2}$ miles inside the dredged channel there is about $4\frac{1}{2}$ fathoms water, but in the western part it is much encumbered with islets and rocks, a number of which extend nearly 1 mile into the bay from off the town, with a passage on either side. Porto Romano lies in the northwestern part of the port.

Depths.—In the entrance channel there is a depth of 26 feet; inside the entrance, for a distance of $1\frac{1}{2}$ miles, there is a depth of 22 to 29 feet; in the channel to the town there is a depth of 21 feet; off the town, in a small space of about 200 yards there is a depth of 22 feet; in the channel to Porto Romano there is a depth of 19 feet, and in Porto Romano, 19 to 26 feet.

Lights—Isolotto Bocca.—On Isolotto Bocca, on the southern side of the entrance, a white square tower, 72 feet in height, and surmounting a dwelling, exhibits, at an elevation of 80 feet above the sea, an alternating fixed white and flashing red light; it is visible in clear weather from a distance of 14 miles. (For arc of visibility of both lights, see Light List and chart.)

The light may show irregular between 259° and $264^{\circ} 30'$. Vessels should keep within the light sector to clear Cape Ceraso Shoals.

Isolotto Bianca.—An occulting white light is shown, at an elevation of 26 feet above the sea, from an iron column, 23 feet in height, surmounting a shed, painted black and white in stripes, and situated on Isolotto Bianca; visible 6 miles. (See Light List.)

Quay.—On the southeastern angle of the quay at Terranova Pausania is exhibited, from a steel column 10 feet high, at an elevation

of 12 feet above the sea, a fixed red light, which is visible 3 miles. This light shows white toward the town.

Lightbuoys.—Two lightbuoys mark each side of the channel into the port. The two on the northern side are painted black, and each exhibit an occulting green light. The two on the south side are painted red, and each exhibit an occulting red light.

Rock.—A rock, which shows above water, lies 180 yards southwestward of the head of the quay, and is marked by a cylindrical buoy.

Mole.—A mole has been built, commencing from a point on the shore about 400 yards northward of the extremity of the wharf, passing over Fiorita Islet to Isola Bianca. This mole is being extended from the southeast side of Isola Bianca, and has been completed for a distance of 490 yards in a 93° direction from the island. An unreliable fixed white light is shown at about 100 yards from the extremity of the work.

Beacons and buoys.—The channel above Isolotto Bianca to the anchorage off the town is marked by beacons and buoys.

The buoys moored about 268 yards 92°, 426 yards 202°, and 579 yards 232° from the light on Bianca Island are iron cylindrical buoys with inverted cone topmark, painted black, and marked with white letters Terranova Pausania.

The entrance to Porto Romano is marked by a black buoy on the starboard hand entering, and a red buoy on the port hand. There are two mooring buoys off the town quay.

Anchorage.—There is temporary anchorage for large vessels about 1½ miles from the entrance, in from 8 to 11 fathoms water, over mud.

There is anchorage southward of Punta Figlio, in 5½ fathoms, 400 yards, from the land, with the customhouse bearing 285°. The anchorage inside is about 800 yards west-southwestward of Punta Ginepro, in 23 to 26 feet of water, over mud.

Small vessels can lie alongside the quay off the town.

Town.—At the head of the port is the small town of Terranova Pausania, having a population of 4,348, and a small trade in cattle, cork, and charcoal. The Fiume Padrogiano disembogues by two mouths on the southern side of the harbor. One or two smaller streams also enter the sea. There are the ruins of a cathedral and Roman remains of the ancient Olbia in the immediate vicinity.

Communication.—Weekly steamers to Genoa, Leghorn, Madalena, Aranci, and to Cagliari, calling at the intermediate ports on the east coast. Railroad communication with Aranci and Sagliari, and telegraphic communication. The telegraph office is open till midnight.

Supplies of fresh provisions are plentiful, and there is an abundant supply of good water from a hose on the quay.

Capo Ceraso.—From the entrance to Porto Terranova the coast trends eastward and is low and marshy, forming several coves and points as far as Capo Ceraso, a distance of $3\frac{1}{2}$ miles. It is fringed by islets, rocks, and shoals, which extend seaward for a distance of 800 yards. Near the entrance of Porto Terranova is Liscia delle Saline, and between it and the cape, Porto Vitello. Capo Ceraso has an islet at its foot and rocks extend about 400 yards from the eastward of it. Monte Maladormida, 715 feet high, and the highest peak near the cape, has a beacon on its summit.

Capo Ceraso—Beacon.—A beacon in the form of a truncated pyramid 13 feet in height and painted white, is built on a rock situated about 320 yards southwestward of the outer shoal off Capo Ceraso and about 2,843 yards 59° from the triangulation station on Mount Maladormida.

Buoy.—A conical buoy, painted in white and red horizontal bands, surmounted by a staff and cone, and marked "Capo Ceraso," is moored in about $8\frac{1}{2}$ fathoms about 100 yards eastward of the outer part of the 3-foot shoal off Capo Ceraso.

Secca Sperlatto, with a least depth of $3\frac{1}{4}$ feet, and of small extent, lies at the extremity of a bank of sand and rocks above water, which extends about 700 yards from the shore, midway between Punta Ruja and Capo Ceraso.

The light of Isolotto Bocca is obscured over Punta Ruja and Secca Sperlatto, and the irregular flash shows for about 400 yards to the northward of them.

Mooring buoy.—A mooring buoy lies in the center of the bay, eastward of Punta Ruja.

Punta Coda Cavallo, 6 miles south-southeastward of Capo Ceraso, is the termination of high, undulating land; Isola Proratora lies close to its northern side, and is skirted with rocks. The intermediate land is high and broken, and the coast irregular, forming indentations and points fronted with several islets, rocks, and shoals. Isola Tavolara and Isola Molara lie about 1 mile from the shore, in the bight between Capo Ceraso and Punta Coda Cavallo.

From Capo Ceraso the coast trends, in a southwesterly direction, for a distance of 2 miles to Porto Sisco, a circular cove, in which the depths are from $1\frac{1}{2}$ to 4 fathoms, with a sandy beach, but as it is exposed to the eastward, and there are rocks at its head, it is seldom visited.

To the eastward of the cove, and $1\frac{1}{4}$ miles southward of Capo Ceraso, is Isola Cavalli, 49 feet above the sea, and nearly united with other smaller islets, lying between its southwest part and the coast; there is no passage between. At nearly $\frac{1}{2}$ mile westward of Isola

Cavalli is a rocky shoal with $1\frac{1}{2}$ fathoms water over it, between which and Capo Ceraso the depths are from 7 to 12 fathoms. The bay between Capo Ceraso and Isola Cavalli is known as Golfo Sparlatta.

Porto San Paolo.—The above islets form with the coast an inlet on the southward about $\frac{3}{4}$ mile in length and 800 yards in width, named Porto San Paolo. Its entrance is open to the eastward, but protected from the sea by Isola Tavolara, distant $\frac{3}{4}$ mile. Coasters anchor in 2 fathoms water, but large vessels farther out, southward of Isola Cavalli, in 5 or 6 fathoms. Near the shore of the inlet the water is shallow.

Isolotto Reulino, small, of a red color, and 36 feet above the sea, lies 1 mile to the southeastward of Cavalli, $\frac{3}{4}$ mile from the coast of Sardinia, and rather more than $\frac{1}{2}$ mile from the western end of Tavolara. It is nearly joined to the coast by shallow water and rocks, which form the south side of the channel to Porto San Paolo. Vessels from the eastward should pass about 400 yards northward of the islet, or midway between it and the spit extending southward from the western point of Isola Tavolara.

Porto Taverna.—Punta Pietra Bianca, so named from the color of the land, is 1 mile southward of Isolotto Reulino, and between is the entrance to Porto Taverna. This port is 1 mile deep, open to the northward, and sheltered by Isola Tavolara, the islet of Reulino, and its adjacent rocks and shoals. To the northwestward of Punta Pietra Bianca, and close-to, is Isolotto Mezzo, surrounded by rocks, leaving a narrow boat passage between it and the point.

Anchorage.—The anchorage, in 7 or 8 fathoms water, is sheltered from all winds but those from the east-northeast, which at times send in a considerable sea; small vessels anchor on the eastern shore to the southwestward of Isolotto Mezzo, where they are more sheltered. A rock, about 40 yards in diameter, with a least depth on it of 23 feet, bears 253° , distant 800 yards, from Isolotto Mezzo.

Isola Tavolara, $3\frac{1}{4}$ miles in length in an east-northeasterly and west-southwesterly direction, $\frac{3}{4}$ mile in breadth, is high, arid, clifly, and rugged, and nearly inaccessible on all sides, with its greatest elevation to the southwestward, where it terminates in Monte Canone, conical, and 1,847 feet high.

The southwestern extremity is low, and terminates in a tongue of land surrounded by rocks and shallow water; the northern extremity of the shoal ground, with 2 fathoms over it, named Secca di Tavolara, lies 1,100 yards northward of the southwestern extremity of the island, and has 7 fathoms close-to. Westward and southward of the same point the shoal ground extends from 700 to 1,100 yards; with these exceptions the island is steep-to.

Landing and casual shelter will be found in two coves, which terminate in a beach, one at either end of the island; that to the north-

eastward, named Spalmatore di Fuori, is 800 yards deep, and about 200 yards wide, with 16 fathoms at the entrance to 4 fathoms within; the cove to the southwestward, known as Spalmatore di Terra, affords shelter for small vessels in from 5 to 15 fathoms water, over weed and sand, but it is exposed to the winds southward of east, and those from the eastern quarter cause a considerable sea on this part of the coast.

Light.—On the northeastern side of Isola Tavolara, and nearly midway between the entrance of Spalmatore di Fuori and Punta Papa, is a square, yellow tower, 64 feet in height, with battlements, and rising from the center of the keeper's dwelling, painted red and white in horizontal stripes; it exhibits, at an elevation of 538 feet above the sea, a fixed and flashing white light; it is visible 27 miles. (For arc of visibility, see Light List and chart.)

Isola Molara, 1 mile to the southeastward of Isola Tavolara, is 531 feet above the sea, $1\frac{1}{2}$ miles in length in a west-northwesterly and east-southeasterly direction, and covered with brambles. A small islet, with several detached rocks, lies about 600 yards off its northwestern end, and the northwestern side of the island is foul. Off the northeastern side of the island is Scoglio Porri, distant 400 yards from the shore. Between Isola Molara and Tavolara there are from 10 to 27 fathoms water, and the channel between Molara and Isolotto Proratora, on the northern side of Punta Coda Cavallo, is about $\frac{1}{2}$ mile wide, with depths of from 13 to 15 fathoms, but it contracts somewhat to the westward, with the shoal water off Molara.

Isolotto Molarotto, a conical rock about 65 feet above the sea, and situated 1.6 miles eastward of Isola Molara, is of a red color, bare of vegetation, and steep-to; the island is foul on the eastern side to the distance of 200 yards; and a sunken rock, having a depth of 11 feet over it, lies nearly 400 yards southwestward from the southwestern side.

Scogli Cervi, 1 mile southwestward of Molarotto, are two rocks a little above water, standing at the southeastern corner of a shoal and rocky plateaux, which extends from the islets $\frac{1}{4}$ mile in a northerly and a westerly direction.

Vessels may pass through the channel between Scogli Cervi and Isola Molara, but should avoid the channel between Scogli Cervi and Isolotto Molarotto, as, in addition to the shoals already mentioned, a dangerous shoal, having a depth of $2\frac{1}{2}$ fathoms, lies about 700 yards northeastward from Scogli Cervi.

In passing between the foregoing islands and the main island, caution is requisite, as the currents in the different passages are uncertain both in velocity and direction.

Wreck.—The wreck of the Italian steamer *Palestina* lies fast near the western extremity of the shoal extending off Cervi Islet, between Molara and Mollarotto Islands.

Porto Brandinchi lies about $1\frac{3}{4}$ miles southwestward of Punta Coda Cavallo, and the promontory affords shelter to vessels from northerly winds; it is about 1 mile deep, and nearly the same distance in width. The entrance is about 400 yards wide between Isola Rossa, on the north, and Testa di Moro, on the south; the latter is a pointed rock above water, so called from its shape and color, which is the extremity of a ledge of rocks extending about 1 mile northeastward from Punta Sabatino. Punta Brandinchi is a headland, 95 feet high, which divides the western part of the bay into two parts, both of which have white sandy beaches; the inner end of the headland is surrounded by marshes.

Anchorage.—The anchorage is in 8 fathoms, about 800 yards westward of Isola Rossa. Coming from the northward, having rounded Punta Coda Cavallo, bring Scogli Cervi in range astern with the center of Malarotto, bearing 44° , until Testa di Moro is sighted ahead, which steer for until Isola Rossa is abeam, when steer for the northern extremity of the white beach southward of Punta Brandinchi, which course will lead to the anchorage passing 250 yards southward of Isola Rossa.

Punta d'Ottiollo, $5\frac{1}{2}$ miles southward of Punta Coda Cavallo, is rocky, and 3 miles north-northwestward of Punta d'Ottiollo is Punta Sabatino, the intermediate coast forming a bay, with a sandy beach 3 miles in length, within which is Lago San Teodoro.

Anchorage.—There is anchorage for large vessels off San Teodoro Beach in from 11 to 15 fathoms water.

About 1 mile southward of Punta d'Ottiollo is Scoglio Petroso, not far from the shore, with reefs extending seaward above $\frac{1}{2}$ mile. At Punta Santa Anna, 2 miles farther southward, there is a conspicuous white patch on a low hill near the sea.

Punta and Scogli Pedrami.—About 1.3 miles beyond Punta Santa Anna, and 4 miles from Punta d'Ottiollo, is Punta Pedrami, to the eastward of which a chain of islets of the same name, a little above water, with a reef some distance farther out, extend $1\frac{1}{4}$ miles from the shore. The passage within them is only suitable for boats.

The Fiume Posada runs into the sea $1\frac{1}{2}$ miles southward of Punta Pedrami.

Punta Caletta lies $2\frac{1}{2}$ miles southward of Punta Pedrami, and 2 miles farther southward is Punta Santa Lucia. Punta Caletta may be recognized by the white cylindrical tower of San Giovanni northward of it, and by a group of houses southward of the tower. Santa Lucia has the ruins of a tower on its extremity, and may be recog-

nized by a group of reddish colored houses behind the tower; there is a long stretch of white sand standing out between the green bushes, which is especially conspicuous when seen from the northward.

Posada lies about 2 miles northwestward of Punta Caletta, and is situated along the steep sides of a small conical hill, on which is an old castle.

Siniscola, with a conspicuous steeple, lies about 4 miles westward of Punta Santa Lucia, and its loading place is in a small sandy creek northward of Torre Santa Lucia; it exports grain, fruit, honey, and cheese.

Anchorage.—There is anchorage southward of Punta Caletta in from $6\frac{1}{2}$ to 7 fathoms, with Torre San Giovanni in range with Posada. The weekly steamer between Leghorn, Genoa, and Cagliari anchors here.

Capo Comino, the eastern extremity of Sardinia, is the termination of high undulating land which extends in a northeastern direction. The cape is low, salient, and near it on its northern side is the small islet of Rossa. From Punta d'Ottiolu the coast is low, with several lagoons, and is all along backed by elevated land. Punta Maggiore, 6 miles westward of Punta d'Ottiolu, is 3,182 feet above the sea. Monte Alvo, 14 miles westward of Capo Comino, terminates in tableland, is 3,701 feet above the sea, and from its whitish appearance is a good mark for this part of the coast. The town of Siniscola lies at the eastern foot of this range.

During strong westerly winds heavy squalls blow through the valleys and are felt some distance seaward.

Golfo di Orosei.—Golfo di Orosei is formed between Punta Nera ($8\frac{1}{2}$ miles to the southward of Capo Comino), and Capo di Monte Santo, which is distant from it 18 miles to the southward. With the exception of 4 miles of the northwest shore, it is bounded by perpendicular cliffs of considerable elevation, broken by small bights with pebbly beaches, here boats may find shelter with offshore winds. Among the crags are wild olive trees and stunted timber, and several small streams enter the sea.

The rocks which lie off the cliffs do not extend any distance, and the gulf is without any other hidden danger; 1 mile from the shore, in the southern part of it, there are depths of 30 fathoms and upward. It is less deep to the northward; $1\frac{1}{2}$ miles beyond a line joining the entrance points there are 527 fathoms water, over mud.

Orosei.—At $2\frac{1}{2}$ miles west-southwestward from Punta Nera is the mouth of the Fiume Orosei, the outlet of many other hill streams. It runs into a salt lake, $2\frac{1}{2}$ miles in length and about $\frac{1}{4}$ mile in breadth, within the sandy shore; boats can navigate the river for some little distance. The town of Orosei, with a population of about 2,079, is

on the right bank of the river 1 mile from the coast, and upon elevations inland are some chapels and several villages.

A castle stands on a hill on the same side of the river about 3 miles inland, and Monte Tuttavista, southwestward of it, rises to an elevation of 2,641 feet above the sea. The country around is very fertile, but unhealthful during the hot season. Vessels call for the productions of the province, consisting chiefly of corn and cheese.

A bank of sand has formed off the custom house at Orosei, extending about 280 yards from the shore.

Communication.—The steamers running between Genoa, Leghorn, and Cagliari call here weekly, and also at Cala Gonone, 6 miles farther southward, which is the shipping port of Dorgali.

Coast.—Three and a half miles from Fiume Orosei, passing an uncultivated sandy coast, is a low point named Nera di Osalla, off which there are rocks; Cala Cartoi is upon the southern side of the point, at the mouth of a stream, beyond which commences the range of cliffs before mentioned.

Capo di Monte Santo is a bold rugged promontory sloping from an elevation of 2,398 feet above the sea, and terminating in abrupt cliffs.

Golfo di Tortoli.—The coast bends toward the southward and westward from Capo di Monte Santo, and with Capo Bellavista, lying 10 miles to the southward, forms Golfo di Tortoli. Close off the shore, $4\frac{1}{2}$ miles from Capo di Monte Santo, is Punta Guglia, a little to the northward of which is a small bight, where a good supply of water can be procured. The tower and chapel of Santa Maria are on a point 2 miles southward of Punta Guglia; thence the shore of the gulf is low and sandy; two rivers flow into it, and there is a large lake, Lago di Tortoli, on the southwest side, which in winter is navigable for boats, supplying with fish the neighboring villages of Girasol, Lazzorai, and Donigalla.

Isola Ogliastro, about 1 mile south-southeast from Torre Santa Maria, is a rugged mass of red rock, 160 feet above the sea, having several rocks around it both above and under water; there are, however, 9 fathoms water within 200 yards of the island, and a good passage between it and the shore. There is anchorage southwestward of the island, in 7 fathoms of water, about 400 yards from the shore. The fixed red sector of Porto di Tortoli Mole Light shows over the island.

Capo Bellavista, a promontory, forming the southern side of Golfo di Tortoli, is of porphyritic formation, and moderately elevated; the head is above 1 mile in breadth in a north and south direction, much indented, and bold, off the extreme eastern point. On the northern end are the tower and chapel of Arbatax; on the south, the tower and chapel of San Gemiliano, and on the central

elevation is a lighthouse. Off the cape there are depths of 14 to 16 fathoms at 700 yards, outside of which the depths increase rapidly.

Light.—On the summit of Capo Bellavista is a square tower, 63 feet in height, with battlements, and surmounting a rectangular dwelling, the base of which is painted black and white in bands; it exhibits, at an elevation of 541 feet above the sea, an occulting white light; the light has an estimated visibility of 28 miles. (See Light List.)

Porto di Tortoli (Rada di Arbatax).—The northern point of the cape forms a bay with a sandy beach, from which a good road runs into the interior, and whence the surplus produce of the district is shipped when the winds are favorable.

Port.—From the northwestern side of the point a mole extends northward and northwestward, for a distance of 257 yards, thence westward for about 200 yards.

Light.—From a turret, painted in white and red horizontal bands, 20 feet high, erected on the head of the mole, is exhibited, at an elevation of 46 feet above the sea, an occulting white light; it is visible 8 miles.

In the same turret, 33 feet above the sea, is exhibited a fixed red light, which shows a sector of 15° over Isola Ogliastro. (See Light List.)

Tortoli, with a population of 2,105, is about 3 miles westward of the cape, and has a large cathedral with a cupola. The country around is well cultivated, and produces a quantity of cheese, grain, fruits, tobacco, and wines.

Communication.—Steamers between Leghorn, Genoa, Maddalena, and Cagliari call weekly. A tramway between the port and Tortoli, and telegraphic communication.

Supplies.—Provisions may be procured at Tortoli; wood can be obtained in abundance by vessels visiting the Gulf of Tortoli, and water, in favorable weather, near the tower of Santa Maria.

Coast.—Southward of Capo Bellavista is a bay with a sandy shore, into which flows the small Fiume Tortoli, and here coasting vessels find shelter from northerly winds. Punta Nera di Bari, which is low and rocky, is situated 5 miles south-southwestward of the cape, and 2 miles farther in the same direction is Torre di Bari, 23 feet above the sea, off which are a few rocks. Cala Francese, 10 miles southward of Capo Bellavista, affords shelter for boats, and southward of it the coast is rocky. Along this shore there are no dangers beyond 700 yards off; farther out the ground is uneven.

The country is undulating, and of moderate elevation; the higher land approaching the coast toward the south is covered with wood. Monte Gennargentu, 6,130 feet above the sea, and the highest moun-

tain in Sardinia, is situated 19 miles westward of Capo Bellavista. The district of Ogliastra, included between Monte Santo and the Cuadazzoni Range, and separated by a chain of mountains from the rest of the island, is rich in cultivation, and studded with some of the best villages in Sardinia.

Capo Sferra Cavallo.—This rugged headland, 3 miles southward of Cala Francese, is the termination of Monte Ferrau, composed of granite, and 2,877 feet above the sea, which, with Monte Cuadazzoni, trends in a northwestern direction, and to the southward runs nearly parallel to the coast, at about 5 miles distant from it. Off the cape is a small islet, and the coast is fronted for at least 20 miles by cliffs of considerable height, at the foot of which rocks and foul ground extend for a distance of about 400 yards.

Three miles from the cape, on the fall of the cliff, is Torre di San Giovanni di Saralà, cylindrical, white, and 65 feet above the sea; an islet lies a short distance off it. Capo Paleri is $5\frac{1}{4}$ miles farther south, and 2 miles beyond it, at the termination of the cliffs and spur from the Cuadazzoni Range, is Torre Murtas.

Isola di Chirra, about $1\frac{1}{2}$ miles southward of Torre Murtas, is a cluster of rocks or islets included within a circuit of $\frac{3}{4}$ mile; they are from 30 to 40 feet above the sea, and bold close-to on all sides, except to the eastward, where a bank extends with a depth of 2 fathoms $\frac{1}{2}$ mile from the islets. They lie off the center of a pebbly beach with a deep-water channel between. This beach extends from Torre Murtas to Capo San Lorenzo, on which is a tower, $3\frac{1}{2}$ miles to the southward; into the bay run two streams. If navigating the channel between the islets and the coast vessels should keep nearer the islets.

Fiume Flumendosa.—Small islets and rocks extend from this coast to a distance of $\frac{1}{2}$ mile, but at about 1 mile off there are depths of from 12 to 16 fathoms. A chain of peaked hills extend a short distance behind, sloping down upon the south to a lake, and a little beyond, to the Fiume Flumendosa, one of the largest streams in the island, and in the winter very rapid; it flows from the northwest through a mountainous district, and approaches the sea between the villages and fertile grounds of San Vito and Muravera on the south, and Villapuzzu on the north.

Muravera, the chief town of the district, is about $2\frac{1}{2}$ miles from the sea and 1 mile from the river. Porto Corallo (Cala di Torre Corallo), a small bight northward of the river's mouth, is resorted to by the coasting trade for cheese, fruit, grain, etc., but it is only safe in the summer season; it may be recognized by, in addition to Torre Corallo, a whitish house in ruins on the top of a small conical hill, a short distance northwestward of the tower. On the coast, a little to the northward of the town, is a group of houses and also

a small stone pier, which, however, is covered at high tides. Muravera contains a population of about 3,054.

Communication.—Steamers between Genoa, Leghorn, Maddalena, and Cagliari, call off this port once a week.

Coast.—The country between Fiume Flumendosa and Golfo di Cagliari, nearly devoid of habitation, is chiefly occupied by wandering shepherds.

There are several lakes, the largest of which, named Colostrai, upon the southern side of Torre Saline, receives the Picocca and other streams, and, having a communication with the sea, is known as Cala Strallus. Fish are plentiful in this lake, Cagliari market being supplied from it.

Torre Saline stands on a rocky promontory and is 92 feet above the sea, but is not conspicuous, as the tower is the same color as the rocks.

Capo Ferrato, a white rugged point, elevated about 70 or 80 feet above the sea, terminates Monte Ferru, a conical peak, on which is a tower. There is deep water close off it; at 1 mile distant there is a depth of 30 fathoms, and 3 miles eastward of the cape there is 375 fathoms. From Capo Ferrato the coast turns to the westward for about $\frac{1}{2}$ mile, forming Cala Pirastro, open and unsafe; thence the shore continues low and sandy, with small lagoons and brushwood for $6\frac{1}{2}$ miles, to Punta dei Cappuccini, a rocky projection.

Scoglio di Sant' Elmo, small, about 3 feet above the sea, and situated about $1\frac{1}{2}$ miles northward of Punta dei Cappuccini, and about $\frac{1}{2}$ mile from the shore, is bold all around, with 7 fathoms water between it and the shore.

Castiadas anchorage.—There is anchorage between Scoglio Sant' Elmo and Punta dei Cappuccini, about 1,200 yards from the latter, with a sandy bottom.

Radio.—A radio station is established at Castiadas; it is open to the public from sunrise to sunset; the call letters are I. C. C.

Isola Serpentara, about $2\frac{1}{2}$ miles southward of Punta dei Cappuccini, consists of four islands, the group extending above 1 mile in a north and south direction; the largest island is a mass of granite with steep sides and has a tower named San Luigi upon its highest part, 177 feet above the sea. There is deep water all around and depths of from 12 to 15 fathoms between the islets and the shore.

Punta dei Molenti, 2 miles westward of Isola Serpentara, is a small peninsula, little elevated, and joined to the main island by a low sandy isthmus; it is surrounded by rocks.

Anchorage may be taken up in the sound in from 15 to 16 fathoms water, over a bottom of gravel and weed; the best berths are half-way between Cala Piras and the northern islet, and the same

distance between Punta dei Molenti and the southern end of the large island. This latter is known as Rada Porcelli, from the group of rocks, Scogli-i-Porcelli, which extend southeastward from the coast for a distance of about 400 yards.

Porto Giunco.—Between Punta dei Molenti and Capo Carbonara is Porto Giunco and Torre Giunco, over a steep cliff, 210 feet above the sea, is nearly 1 mile northward of Capo Carbonara.

Several rocks, both under and above water, lie off the shore between Capo Carbonara and Horre Giunco; the outer ones, named Il Barca or Boat Rocks, are about 10 feet above the sea, and $\frac{1}{4}$ mile from the shore, with 4 to 5 fathoms water between.

Secca dei Berni are without the line of bay, and in nearly a central position; one of them awash bears 200° , distant $1\frac{1}{4}$ miles from Punta dei Molenti. Nearly 200 yards north and south of the rock awash are two others, the first with 6 feet, the latter with only 1 foot water over it.

Light.—A stone cylindrical-shaped tower, with red and black bands, 18 feet in height, stands on the center of the rocks, and exhibits, at an elevation of 39 feet above the sea an unwatched flashing white light; it is visible 10 miles. (See Light List.)

Anchorage.—There are depths of from 5 to 14 fathoms in Porto Giunco, at a reasonable distance from the shore, and good anchorage may be obtained about $\frac{3}{4}$ mile eastward of the tower, in from 6 to 8 fathoms water, over sand and weed. This anchorage is sheltered from winds northward of northeast round to south, but generally there is a heavy swell with winds from the opposite quarters.

South coast—Capo Carbonara.—This nearly isolated headland lies in a south-southeasterly direction, and terminates in a sharp cliffy point; $\frac{3}{4}$ mile northwestward of the extremity, on a steep pinnacle, is Torre Caterina, 381 feet above the sea, and on the northern extremity of the head, a small fort, Fortezza Vecchia. One-fourth mile southwestward from the fort is Isolotto di San Stefano, 59 feet above the sea, and farther southward, abreast the tower, a rock above the water, the shore on this side of the cape being foul.

Northeastward of the extremity of Capo Carbonara, and $\frac{1}{4}$ mile from the shore, there is a rock with 8 feet water over it.

A sandy isthmus and lake separate Capo Carbonara from the rising ground within, the village of the same name lying in a hollow about 1 mile from the coast. Nearly 15 miles northward are the seven peaks, named the Sette Fratelli or Seven Brothers, the highest of which is 3,333 feet above the sea; they form a good mark for strangers approaching this part of the coast.

Signal station—Semaphore.—On Torre Caterina is a semaphore, 381 feet above the sea, with which vessels can communicate.

Isola dei Cavoli, lying about 700 yards southeastward of Capo Carbonara, is about $1\frac{1}{2}$ miles in circumference and 144 feet above the sea; off the southeastern point are several islets, and some rocks extend $\frac{1}{4}$ mile from the southwestern point. On the eastern side is a rocky bight forming a good boat harbor; whence, should the wind blow on shore, small vessels can run for Cagliari. The island is of gray granite, covered with brushwood, and the formerly ruinous defensive tower is now a lighthouse.

Between the island and Capo Carbonara there are depths of 8 and 9 fathoms, and the water is deep around the island.

Light—Carbonara.—On the northeastern part of Isola Cavoli a circular tower, surmounting a dwelling painted in white and black horizontal bands, with "Faro di Cavoli" on the tower, the whole 123 feet in height, exhibits, at an elevation of 242 feet above the sea, a flashing white light, visible 22 miles. (For arc of visibility, see Light List.)

Telegraph station.—There is a telegraph station on Isola Cavoli.

Secca di Cala Caterina.—About $1\frac{1}{2}$ miles west-southwestward from Capo Carbonara, the ground is uneven, with patches of 7, 6, and $2\frac{3}{4}$ fathoms, over a rocky bottom, surrounded by depths of 20 fathoms a short distance off. The Fortezza Vecchia, well open to the eastward of Monte Bruncu de Sonnu (Bcu. Onnos), bearing about 25° , leads westward of the rock; and Torre Finocchio, a little open to the northward of the extremity of Capo Boi, bearing 304° , leads between the rock and the mainland.

Bellbuoy.—On the northeastern edge of this rock a black bell-buoy is moored. The buoy is surmounted by a conical tube, with black and white stripes, on the top of which is the bell, covered by a hood.

Golfo di Cagliari (ancient Caralitanus Sinus), the largest indentation on the south of Sardinia, lies between Capo Carbonara on the east and Capo di Pula on the west, which lies 24 miles from Capo Carbonara; the gulf is about 12 miles deep. Both sides of the gulf are a succession of rocky points and sandy bays; at the head is a broad sandy beach 11 miles across, broken by the rocky projection of Capo Sant' Elia, from which is exhibited a light.

A high range of hills slopes toward the shores on both sides: but from Cagliari an extensive plain crosses the island to Golfo di Oristano, 44 miles in a north-northwest direction; this plain is fertile and well cultivated. Several streams enter the gulf, those toward the south entering a large lake which communicates by several passages with the sea.

Depths offshore.—At a distance of 3 miles from the eastern shore of the gulf, the soundings vary from 180 to 300 fathoms, but

along the western side, and at 4 miles from the head, on both sides of Capo Sant' Elia, the water becomes shallow, decreasing gradually from 26 and 30 fathoms, with some uneven ground southwestward of the cape.

Baia Carbonara.—Cape Boi, 390 feet above the sea, lies 4.3 miles northwestward from Capo Carbonara, and between them is Baia di Carbonara, about $1\frac{3}{4}$ miles deep; its northeastern side is foul within a distance of $\frac{1}{4}$ mile. Isolotti Pescatelli, in the western part of the bay, are situated 300 yards from the rocky cliffs northward of it, and Secca Pescatelli, a group with 11 feet least water over it, lies nearly $\frac{1}{2}$ mile southwestward of it, with a channel of 8 fathoms between; 10 fathoms will be found at a distance of 400 yards southward of the rock.

Torre Giunco well open to the southward of Isolotto di San Stefano, bearing 90° , leads to the southward of Secca Pescatelli.

Communication.—The steamers between Genoa, Leghorn, Maddalena, and Cagliari, call here every week, but with southwest winds they anchor at Porto Giunco.

Anchorage may be obtained in 11 fathoms water, about 1,600 yards west-northwestward of Fortezza Vecchia, or in a depth of 8 fathoms, $\frac{1}{2}$ mile northwestward of the same; a rock with 1 foot of water over it lies 750 yards northward of the fort.

Coast.—From Capo Boi, as far as Cala Regina, the coast has alternate cliffy points and sandy bays; midway is Torre Finocchio, 285 feet above the sea. Torre di Mortorio is situated on a low, rocky point, whence a level coast trends in a west-northwesterly direction for 4 miles, to the northeastern point of Baia di Quartu, on which is Torre Foxi, 10 feet; and on the point, 1.3 miles eastward of Torre Foxi, is Torre San Andrea, 16 feet above the sea, and named after a chapel a little northward of it. The coast may be boldly approached until nearing this last-named tower, off which a shoal, a spit of rock and sand, extends for a distance of nearly $\frac{1}{2}$ mile, with 5 fathoms a little outside.

Baia di Quartu is formed between the point on which is Torre Foxi and Capo Sant' Elia, a distance of $4\frac{1}{4}$ miles in a west-southwesterly direction; the shore is a fine sandy beach, commanded by a fort upon the east, and on the shore and north projection of the cape are several round towers. The country within to the surrounding villages, a distance of 3 miles, is nearly all occupied by lakes and salt marshes, but beyond is a fertile undulating country, named Il Campidano di Cagliari, which produces some of the finest fruits of the island. The village of Quartu Santa Elena, $1\frac{1}{2}$ miles within the north shore, has a population of 8,510, and its white cathedral, with a cupola and reddish roof, is conspicuous.

The bay has a moderate depth of water, but it is too exposed to be recommended as an anchorage, neither is the holding ground good.

A shoal, with $4\frac{1}{2}$ fathoms water over it, lies just southward of an imaginary line joining Torre Foxi and the southern extremity of Capo Sant' Elia, and nearly midway between them.

Capo Sant' Elia, which separates Baia di Quartu from that of Cagliari, is a limestone head, about 1 mile in extent, with Torre Sant' Elia 446 feet above the sea on its eastern side and low land northward of it; it appears isolated, and is broken into several cliffy points, on which, to the northeastern extremity, is Torre Poetta. On the northern part of the cape is Forte di San Ignazio; and San Bartolomeo Chapel lies at the foot of the northern slope.

Light.—On a point 900 yards southward of Forte di San Ignazio, a yellow circular tower, surmounting a yellow dwelling, the whole 78 feet in height, exhibits, at an elevation of 239 feet above the sea, a group flashing white light; is visible 18 miles. (See Light List.)

Signal station—Semaphore.—On Torre di Cala Mosca, near the lighthouse, is a semaphore station, with which vessels can communicate; it is 230 feet above the sea, and painted black and white.

Rada di Cagliari lies between Capo Sant' Elia and La Maddalena, and is a safe and convenient roadstead for vessels in all weathers; in summer, and in calm weather in winter, vessels here discharge and embark cargo with comparative facility; in the winter months especially it is much frequented by naval vessels and merchantmen for shelter and repairs, as also for provisions and water.

Rocks and shoals.—Close around Capo Sant' Elia there are depths of 4 and 5 fathoms. A small rock above water, named Scoglio Perdaliada, lies 200 yards off the shore westward of the lighthouse. A shoal of $4\frac{1}{2}$ fathoms lies $1\frac{1}{4}$ miles, 245° from Sant' Elia Lighthouse, and another shoal of the same depth lies $\frac{1}{2}$ mile to the northwestward. A shoal flat fringes the whole of the shores of Rada di Cagliari; off the eastern shore, and abreast the town, the 3-fathom curve is found at nearly $\frac{1}{2}$ mile distant.

Secca della Scaffa, about $\frac{1}{2}$ mile in length in a north-northeast and south-southwest direction, and with $2\frac{1}{2}$ fathoms water over it, lies 600 yards southwestward of the entrance to the port.

Lightbuoy.—A red conical buoy, exhibiting a flashing red light 9 feet above the water, and visible 3 miles, is moored, in $5\frac{1}{4}$ fathoms, on the southwestern side of Secca della Scaffa.

Buoys.—Secca della Scaffa is also marked on its northeastern and eastern edge by a red conical buoy, surrounded by a cylinder.

Anchorage.—The usual anchorage is about 800 yards southward of the entrance to the port, in $6\frac{1}{2}$ fathoms, with Sant' Elia Lighthouse

bearing 122°, or farther out, in 10 fathoms, with the lighthouse bearing 97°.

The shore between Capo Sant' Elia and Cagliari is a shallow bight, partly occupied by salines; into it is drained the surplus water from the lakes, and fronting it are many banks about level with the water.

The western shore of Rada di Cagliari is composed of a narrow strip of sandy beach named the Playa, which extends in a south-westerly direction for 5½ miles to La Maddalena; within this is Lago di Cagliari, of about 5 miles in length and of salt water, which communicates with the sea through eight bridged passages; near that next to the city is Torre Scaffa, and upon the ridge are several salinas.

This lake is shallow, has upon it several flat islands (on the largest of which is San Simone Chapel), and receives at its northern extremity the Fiumi Mannu (from the northeast), the Samassi (from the north), and Sixerri (from the westward); it abounds in fish, such as the mullet, eel, etc., also in waterfowl, and is navigated by flat-bottomed boats.

Port.—The harbor is formed by two moles, the eastern of which, named Nuovo Molo, extends from the eastern side of the city first southwestward for a distance of 208 yards, then westward 216 yards, and turning west-northwestward for a remaining distance of 205 yards to its head.

The western mole, Molo Ponente, from the western side of the city, extends south-southeastward for a distance of nearly 400 yards, leaving an entrance between it and the head of Nuovo Molo, about 320 yards in width. Two quays extend about 180 yards from the northeastern side of the port, the railroad running on to each.

The eastern of these quays is named Molo Sant' Elmo, and immediately eastward of it is La Darsena or inner harbor, and here is the customhouse and the port office.

Depths.—In the entrance to the port there is a depth of 24 to 26 feet; inside the depths are generally from 21 to 27 feet; in the entrance to La Darsena 24 feet; and in La Darsena from 12 to 24 feet.

Dredging.—In 1913 dredging was commenced at the entrance to the harbor, both by day and night. At night the dredger shows three lights vertically, the upper and lower red and a white light between.

Lights—Nuovo Molo.—On the outer head an iron support on a shed exhibits, at an elevation of 28 feet above the sea, an occulting green light, visible 7 miles. The light structure and shed are painted in white and black horizontal bands. (See Light List.)

Molo Ponente.—An occulting red light is shown from an iron standard 10 feet in height, on the extremity of Molo Ponente, at an

elevation of 25 feet above the sea; it is visible 2 miles. The framework tower and house, from which the light is shown, is painted in red and white horizontal bands. (See Light List.)

La Darsena.—At the extremity of the south mole of La Darsena a fixed green light is shown, at an elevation of 16 feet above the sea, from an iron column 11 feet in height; it is visible 2 miles.

A gray turret of masonry 19 feet in height on the extremity of the north mole of La Darsena (Molo Sant' Elmo), exhibits, at an elevation of 23 feet above the sea, a fixed red light which is visible 2 miles.

Two fixed white lights, vertically, 3 feet apart, are shown at an elevation of 19 feet above the sea, from an iron standard 17 feet in height, situated at the northeastern corner of La Darsena, and are visible in clear weather from a distance of 2 miles. (See Light List.)

Mooring buoys.—There are three gray cylindrical mooring buoys in the harbor.

Pilots can be obtained.

Cagliari (Caralis of the Phœnicians), the capital of Sardinia, lies at the head of the gulf, $2\frac{1}{2}$ miles north-northwestward of Capo Sant' Elia; the central and original portion of the city is walled, with strong towers of Pisan structure, and the summit, elevated about 400 feet above the sea, is crowned by the citadel. Other defensive works comprise Castello di San Michele, upon a northern elevation of 524 feet; Forte Russo, on a height to the eastward; and a fort near the lake to the westward.

Without the walls on the western side is the mercantile and industrial quarter of Stampace, and below it La Marina, which is chiefly occupied by the maritime community, foreign consuls, etc. On the east is Villa Nuova, with many detached houses and gardens and an agricultural population.

Cagnari is the seat of a royal court and tribunal of commerce; it is the residence of the military commandant of the island and of the archbishop primate. Within the walls are the palace, cathedral, university, hospital, museum, and other public institutions; there are also numerous churches and convents. From the sea the city has an imposing appearance, from its commanding position, its many and varied towers and domes, the cathedral's being a conspicuous one, enlivened by the foliage of the palm and other trees; but the streets are steep and narrow, ill-paved, and the way broken by arched passages and steps. The population in 1911 was 61,013.

Communication.—There are weekly steamers to Aranci, Leghorn, Genoa, Naples, Palermo, and Tunis; fortnightly steamer to Porto Torres. Railroad communication with Porto Vesme, Tortoli, Cristano, Bosa, Nuovo, Porto Torres, Terranova, and Aranci; telegraphic communication with all parts. The telegraph office is always

open. There is a radio telegraph station at Castiadas. There is a good road from Cagliari to the northern end of the island, on which regular conveyances run. A steam tram runs to Santa Elena Quartu.

Coal and supplies.—About 1,500 tons of coal are kept in stock, and coaling is carried on by baskets. There are 3 or 4 barges or lighters, holding 35 to 40 tons, and from 200 to 300 tons could be put on board in 24 hours; but if steamboats are used to tow the lighters a much larger quantity. The coal wharf is 1,000 feet in length and has a depth of 24 feet alongside at low water. Southerly winds may prevent or impede coaling.

Supplies of fresh meat, vegetables, and bread may be procured, and the water, which may be obtained near the quay and from tank vessels, is good and plentiful.

Repairs.—Small repairs to torpedo boats and gun vessels are executed here; there is a hand crane which will lift 10 tons near the head of Molo Sant' Elmo.

Hospital.—At the civil hospital sailors of all nations are boarded at fixed rates of payment.

Trade.—The chief exports from Cagliari are wines, salt, cheese, cattle, skins, dried fish, wheat, charcoal, iron, zinc, and lead ores. The imports consist of wines and spirits, colonial produce, soap, cotton and silk goods, raw iron, coals, hardware, earthenware, and glass.

Winds.—The land winds are the most frequent and violent, especially those from the north and northwest, which predominate nearly two-thirds of the year; it is said the winds from seaward never blow home.

Coast.—La Maddalena, situated near the southern end of the sandy ridge outside Lago Cagliari, is a shipping place for iron; there is a pier and a short line of railroad connecting it with the mines near Assemini. Punta Savora, on which there is a tower, 23 feet above the sea, is 6 miles southward of La Maddalena. About midway is Torre Antigori, in ruins, and about $\frac{1}{2}$ mile northward of Torre Antigori, on the shore, is a dynamite factory, a group of reddish houses with two tall chimneys, and very conspicuous from seaward; there is also a small pier with iron framework.

From Punta Savora to Capo di Pula, a distance of $4\frac{1}{2}$ miles, the intermediate coast is broken into cliffy points and long sandy bays.

Isola di San Macario, 3 miles southward of Punta Savora, is on the extremity of a shoal which extends nearly 800 yards from the coast; on its northern part is a tower, 102 feet above the sea. The village of Pula, with a population of about 1,780, is about 1 mile from the coast, abreast the island.

Water can be procured in any quantity from the mouth of the Manu, which will be seen in the bay within the island; other supplies can be procured from the village at a short notice.

Anchorage.—Vessels requiring water, or shelter from westerly winds, may obtain anchorage in the small bay northward of Capo di Pula, in depths of from 7 to 8 fathoms, $\frac{3}{4}$ mile offshore.

Capo di Pula is a black conical crag with a rock lying off it; on its summit is a tower 115 feet above the sea, and on the low sandy spit connecting it with the main island is San Effisio Chapel, and many ruins are scattered around. Porto di Pula (a well-sheltered boat harbor) is formed on the western side, between the cape and a rocky head, $\frac{3}{4}$ mile apart. The shore of the port is broken by marsh islets and salt lakes, but there are extensive evidences of its ancient importance when (as the Roman city of Nora) it possessed its mole, theater, baths, aqueduct, etc.

Coast.—From the western point of Porto di Pula a nearly straight coast trends $7\frac{1}{2}$ miles in a southwest direction to Isolotto di Chia, westward of which, on a headland, is a tower; the coast, until within $1\frac{1}{2}$ miles of the latter, is chiefly a gravelly beach, bold in approach, and backed by elevated ground. Approaching Isolotto di Chia the high ground nears the coast, terminating in bold, steep cliffs, off which, but close in, are a few rocky heads.

Chia.—Between Isolotto di Chia and Torre Chia is the mouth of Fiume Chia, flowing from the northward through a pretty valley, near the village of Domus de Maria, and also near the smaller village of Chia. Within the sandy coast line are two lagoons, and the small island of Giudeo lies off the shore about 700 yards from Capo Spartivento.

Water.—Near Torre Chia is one of the best watering places of the island.

Anchorage.—Off the coast abreast of Cala di Ostia and Cala di Chia are good anchorages with shelter from northwest winds; it is easy to get underway from either should the wind shift on-shore.

Capo Spartivento (ancient Herculis Prom.) has a low cliffy front with a few rocks outside its western point; in a northern direction the land is high, Punta Severa, a peak 11 miles distant, being 3,215 feet above the sea. A rock, with 2 fathoms water over it, lies about 333 yards 180° from the cape, with depths of 5 and 7 fathoms in-shore; and Secca di Giudeo, on which the depth is 6 fathoms, lies $1\frac{1}{4}$ miles eastward of the lighthouse, and the same distance southwestward from Torre Chia. The bottom is generally rocky, but the water is deep around and the coast otherwise bold.

The tower on Capo di Pula, well open of the intervening coast, bearing about 43° , leads to the southward of the 2-fathom rock.

Light.—A red circular tower with a square base, and surmounting a red dwelling, the whole 64 feet in height, situated on the western part of Capo Spartivento, exhibits a group occulting white light

at an elevation of 267 feet above the sea, which is visible 20 miles. (For arc of visibility see Light List.)

Signal station—Semaphore.—Upon Capo Spartivento is a semaphore, 682 feet above the sea, with which vessels can communicate.

Storm signals are also shown from the station.

Porto Malfatano.—Nearly 3 miles west-northwestward of Capo Spartivento is Torre Malfatano, 220 feet above the sea, on the eastern side of which are two bights. Several islets border the coast, those named Ferraglione (Padiglioni), lying $1\frac{1}{2}$ miles from Spartivento, are close in and bold-to; from them an indented shore turns to the northward for $\frac{1}{2}$ mile, curves to the westward a short distance within Isola Teredda (Tuaredda) 102 feet, then resumes the same northern direction to a deep bight which is very shallow at its head.

This indentation, bounded on the west by the long narrow neck of Capo Malfatano, has an entrance 700 yards in width, with depths of from 4 to 6 fathoms, but shoaling to 2 or 3 feet 700 yards within it. Except at the head of this port, where the shore is flat with a lake beyond, the land is tolerably high; the country around is barren, and has a deserted appearance.

The port is open to the southeastward, but coasting vessels lie here when bound to the southward and westward with contrary winds.

Close off Capo Malfatano is a sunken rock, but a 5-fathom curve incloses it within a less distance than 200 yards from the shore, which continues generally steep to the northward.

Baia dell' Isola Rossa, formed between Capo Malfatano and Capo Teulada, is $7\frac{1}{4}$ miles broad at the entrance, and $3\frac{1}{4}$ miles deep to Porto Teulada, which lies at the head, and at nearly equal distances from the two capes. The shores are, with one exception (upon the western side) free from danger, and are chiefly bounded by bold cliffs, with an elevated barren background. Depths of from 40 to 50 fathoms will be found within $\frac{1}{2}$ mile of both capes, and across the bay, gradually shoaling to 10 fathoms at about $\frac{1}{4}$ mile from the shore.

The eastern shore of the bay trends in with an irregular curve, for $4\frac{1}{4}$ miles, in a northwest direction, to Porto Teulada; $1\frac{1}{2}$ miles from Capo Malfatano is Torre Pixini, 49 feet, and beyond it, on the opposite side of a bight with a stony beach, Isolotto Campiona, 69 feet above the sea. The western shore of the bay is much indented.

Porto Teulada is an inlet of $\frac{1}{4}$ mile in extent, at the head of which are salt lakes, which receive the waters of two small streams from the hills. At the entrance there is a depth of 5 fathoms, but toward the beach it shallows rapidly; the port is open to the southward, but is frequented by the flat-bottomed boats of the country; Torre del Budello, 75 feet above the sea, stands on the western entrance point.

Punta Nera lies 1,200 yards southward of Torre del Budello. There is shoal water nearly 200 yards southward of Punta Nera, and a detached shoal, with a least depth of $3\frac{1}{4}$ fathoms over it, lies 700 yards northeastward of the same point.

The village of Teulada, with a population of 3,325, and not visible from seaward, lies about 3 miles to the northeast, and nearer, but in a northerly direction, are the chapels of Santa Lucia and San Isidoro.

Isola Rossa.—About 1 mile to the southward of Porto Teulada, and a third of that distance from the western entrance point, is Isola Rossa, about $\frac{1}{4}$ mile in length, the same in breadth, and 177 feet above the sea at its northeast point, with a shoal extending 200 yards northward from its northwestern end. It derives its name from the red appearance. In the channel between the island and the shore there are depths of from 5 to 8 fathoms.

Anchorage.—There is anchorage, sheltered from all winds except those from southeast to southwest, in 10 fathoms, hard sand, about midway between Punta Nera and Isola Rossa, but the northwest squalls here are very heavy. The island and anchorage are much resorted to by small vessels during the fishing season.

Porto Scuro, an indentation 2 miles to the westward of Isola Rossa, is about $\frac{1}{2}$ mile deep, open to the southeast, and shoals from 12 fathoms at the entrance to $1\frac{1}{2}$ fathoms at the head. Torre di Porto Scuro is situated on the cliffy point which separates Porto Scuro from Cala Brigantina.

Secca di Porto Scuro, the only hidden danger in Baia dell' Isola Rossa, is a small rocky shoal with 9 feet water over it, lying 1.2 miles 68° from Torre di Porto Scuro, and a third of that distance from the shore; a shoal, with $2\frac{1}{2}$ fathoms water over it, lies 250 yards northward of Secca di Porto Scuro.

The northern of two high peaks (over the eastern side of the bay) in range with the inner side of Isola Rossa leads eastward of the rock.

Cala Brigantina, about 1 mile southward of Porto Scuro, is about 1,200 yards wide, and the same distance deep; it has depths of $6\frac{1}{2}$ to 10 fathoms, and shoals about 400 yards from the head.

Water.—There is a small well of water at the head of Porto Scuro.

Anchorage.—Baia dell' Isola Rossa is only recommended as a temporary anchorage, during northwest winds, for sailing vessels unable to fetch Golfo di Palmas, and not wishing to run back to Cagliari.

Capo Teulada (ancient Chersonesus), a singularly formed headland, and the most southern point of the island of Sardinia, is about

1 mile in extent north and south, and nearly the same east and west, the southern face being the most elevated, and falling in steep cliffs 756 feet above the sea.

It is very irregular in outline both over the surface and round the coast, and slopes down to a sandy isthmus, about 100 yards across connecting it with the mainland of Sardinia, and separating Cala Piombo on the west and Cala Brigantina on the east.

Cala Piombo.—Two miles to the northward of Capo Teulada is the bluff peak of Piombo, upon which, at an elevation of 633 feet above the sea, is a tower; between is a bight, Cala Piombo, $1\frac{1}{2}$ miles deep, in a northeasterly direction, toward the sandy isthmus before mentioned, bold to the shores. Cala Aligosta is a small bight close northward of Capo Teulada; vessels may anchor in these bights with winds from the northward round to southeastward.

West coast—Golfo di Palmas.—This deep indentation, affording safe and convenient anchorage for every class of vessel, is formed between Capo Teulada and the coast northward, on the east, and the island of Sant' Antioco (of which Capo Sperone is the southern point), on the west, which is distant $11\frac{3}{4}$ miles from Capo Teulada.

The bay is about 8 miles deep, the eastern side forming two large bights and several smaller indentations; the western side is straighter, and about $6\frac{1}{2}$ miles in length; the hills are low on either side, and the broad head of the bay is an extensive plain, broken by lakes and salt marshes. Except the small rocks lying a little within the entrance points, there are no hidden dangers, and the shores may be boldly approached to within $1\frac{1}{2}$ miles, where the depth is 5 fathoms, gradually increasing to about 30 fathoms at the entrance of the bay.

Secca di Cala Piombo, about 1,200 yards northwestward of Punta Piombo, is of small extent, and has about 1 fathom water over it; there is 13 fathoms water in the channel eastward, and deep water close outside.

Porto Pino.—Nearly 4 miles northward of Punta Piombo is Punta Zari, steep and cliffy, with a curved coast between, the southern part of which is broken into rocky points with several detached rocks lying about $\frac{1}{4}$ mile off; the northern part is a long, narrow, sandy beach fronting salt lakes of considerable extent. The entrance to the lakes, adapted for boats, is a roughly-formed canal a little east of Punta Zari, and under the name of Porto Pino is much frequented during the fishing season. The best anchorage is in from 6 to 7 fathoms, about $\frac{1}{2}$ mile eastward of Punta Zari, with Torre di Cala Piombo bearing 164° .

Porto Botte.—A steep rocky coast continues northward for $3\frac{1}{4}$ miles to Punta di Porto Botte, and is bordered by a ridge of hills about 130 feet above the sea; from this point the shores are flat and

sandy for 2 miles, curving inward, and forming at the northern end a secure harbor for small vessels named Porto Botte; the land a little within the beach is occupied by a large salt lake, between which and the hills beyond is the cultivated plain of Sulcis.

Upon the outskirts are a few villages, and Torre Palmas is $2\frac{1}{2}$ miles northward of Punta di Porto Botte and 1 mile from the port, from which there is a road leading to the town of Iglesias, 16 miles distant.

Coast.—Fiume Palmas, flowing from the eastern mountains, enters the bay nearly 1 mile northwestward of Punta Lana, which is the western point of Porto Botte, and from this the head of the gulf, composed of marsh and lakes, with sandy islets, upon which are a few fishers' huts, bends round for nearly 4 miles to a fort situated on the point of a narrow causeway, which is separated by a boat passage from the island of Sant' Antioco; this channel is crossed by a rude stone bridge, 300 feet in length, said to have been built by the Romans.

Sant' Antioco (ancient Sulci), a large village with a population of 4,052, is situated nearly 1 mile north-northwestward of the fort; the principal industry is vine culture. There is a church at Sant' Antioco and a castle of old irregular construction on the hill near it, elevated nearly 200 feet above the sea.

Un Canale.—A boat channel, with about 8 feet water, and marked by stakes, extends 450 yards south-southeastward of the bridge. With northwesterly winds a very violent current is experienced in the boat channel.

Anchorage may be obtained in 5 fathoms water, over weeds, about 1 mile from the bridge, with Monte Perdas de Fogu bearing 245° .

Communication.—The steamers of the line running between Cagliari and Porto Torres, call here weekly; an omnibus service runs twice a day to Iglesias; postal communication by mail carriage with Cagliari and telegraphic communication with all lines at limited hours.

Supplies of fresh meat and vegetables are difficult to obtain.

Coast.—From the bridge, the western side of the bay is nearly straight in a south-southwesterly direction for $5\frac{1}{2}$ miles to Canai Point and Tower; for about half the distance it is fronted by a sandy beach with some cultivation, and a few cottages at the foot of Monte Perdas de Fogu, a hill 889 feet above the sea; it then becomes bold and rocky, indented by small sandy coves.

Cala Maladroxia, $3\frac{1}{2}$ miles from the bridge, has a streamlet at the southern end of the beach, beyond which are several sunken rocks. Torre Canai, 95 feet above the sea, is on a low bluff point at the foot of the wooded heights of Monte Arbus, 755 feet above the sea,

thence the coast is high and cliffy for 2 miles, in a west-southwesterly direction, to Capo Sperone, the western entrance point of the bay; two small rocks lie about 200 yards off the shore, but off the cape and Punta Canai there is a depth of 5 fathoms about 300 yards from the shore.

Depths offshore.—A flat of sand and stone extends for some distance outside the shore in the northwest corner of the bay, and the 5-fathom curve rounds it $1\frac{1}{4}$ miles off, but approaches very close to the land of Cala Maladroxia, $3\frac{1}{2}$ miles to the southward.

Isolotto la Vacca, situated nearly 2 miles southeastward of Capo Sperone and $1\frac{3}{4}$ miles southward of Torre Canai, is a steep rock, $\frac{1}{4}$ mile in length, in a north-northeasterly and south-southwesterly direction, and 305 feet above the sea; about 300 yards to the north is a rock above water, named Vitello, and another off the southwest end nearly 200 yards distant; otherwise there is deep water around in every direction.

Canai Rock, or Secca della Vacca, a small rock, nearly awash, lies about $\frac{1}{4}$ mile from the shore halfway between Capo Sperone and Torre Canai, with a depth of 9 fathoms close outside and 5 fathoms a little within it: there are two other rocks about 200 yards off the shore abreast it. Monte Orri, just open eastward of Monte Narcao, bearing 41° , leads to the eastward of Canai Rock and between it and Isolotto la Vacca.

Beacon.—The rock is marked by a beacon of masonry, 20 feet in height, in the form of a truncated cone on a square base, painted black and white in horizontal stripes and surmounted by a black cylinder; it is liable to be washed away.

Il Toro, an islet lying $4\frac{3}{4}$ miles south-southwestward from Isolotto la Vacca, is about the same size, equally bold, and 364 feet high. Between the islets there are depths of 16 to 46 fathoms, and in the channel northward of Vacca there are from 10 to 17 fathoms, the bottom being generally composed of sand and gravel.

Anchorage.—The spacious Bay of Palmas offers safe and commodious anchorage for any number of large vessels, and has been much frequented by naval vessels; it is sheltered from all winds except those from the southward, between southwest and south-southeast, and the sea which gets up at the entrance with these southerly winds does not reach the anchorage.

The best berths are from about $1\frac{1}{2}$ to 2 miles off the head of the bay, in 6 or 7 fathoms water; or more to the eastward, the same distance from Porto Botte. A bank extends beyond this shore for $1\frac{1}{2}$ miles, having depths of 4 and 5 fathoms over it, therefore the anchorage must be chosen according to the water required; the holding ground is better on this side than along the western shore. A good

position is with Torre Palmas bearing 33° and Punto di Porto Botte 112° in $6\frac{1}{2}$ fathoms water, over sand.

Sailing vessels, entering with strong northwest winds, often find it difficult to fetch the usual anchorage; they may therefore anchor when they have passed Torre Canai in depths of 14 or 16 fathoms, and will then be sufficiently sheltered.

Directions.—The approaches to Golfo di Palmas are readily distinguished, Il Toro being at times seen from 15 to 20 miles distant; the shores are bold, and the soundings shoal gradually toward the head. Vessels from the westward generally pass between Il Toro and Isolotto la Vacca, and for a sailing vessel with a northwest wind the channel inside the latter is more advantageous; this can with confidence be taken, even at night, by keeping well over on the island side. See also Caution as to Secca Pomata on page 439.

A central range mark through this channel is given, by bringing Monte Orri just open eastward of Monte Narcao, bearing 41° ; these hills are table-topped, and lie to the northeastward of Torre Palmas, before mentioned. A good berth should be given to the eastern shore until Torre di Cala Piombo is passed, to clear Secca di Cala Piombo, which lies more than $\frac{1}{2}$ mile westward of the point.

Caution.—From June to the end of December it is not advisable to land the crews of vessels, especially before the rising and after the setting of the sun. All this part of the coast is very unhealthy as far around as Capo Spartivento, more particularly about the flat shores of Porto Pino, Botte, and Maladroxia, in Golfo di Palmas.

Coast.—From the bridge connecting the causeway of Isola Sant'Antioco with the main island, the sandy boundary of the lagoons (along which is a road) trends about 2 miles to the northeastward to Porto Santa Caterina; a low marshy coast then curves around to the eastward to Punta Dritta, $2\frac{3}{4}$ miles northwestward of the port. This point is a low spit at the foot of an isolated group of hills of moderate elevation; within it the land is level, cultivated, and backed by Monte San Michele, 1,670 feet above the sea, which is 7 miles eastward of Punta Dritta.

From Punta Dritta the irregular low and sandy coast line has a north-northwest direction for 7 miles to Punta Nigra; about halfway is Punta Piringianu, terminating in a narrow ridge separating two bays, in the northern of which is a large salt lake, into which flows Fiume Flumentipido.

Porto Vesme, $2\frac{1}{2}$ miles northward of Punta Piringianu, is a shipping place for minerals and the terminus of a mineral railroad which runs to Monteponi, about 2 miles from Iglesias; small vessels can enter a canal with about 5 feet water in it; at its northern end is the railroad station, and a small mole extends seaward from its western side.

Communication.—A daily service of steamers between the port and Carloforte; a railroad to Monteponi and Iglesias, where it joins the main line to Cagliari; telegraphic communication at hours limited by the mineral company of Monteponi.

Porto Scuso, a fishing village, with a population of about 1,161, is about $\frac{3}{4}$ mile southward of Punta Nigra; about midway and between the rocky frontage of the coast is Porto Paglietta; an octagonal tower, Caserma Doganieri, 52 feet above the sea, stands on the head westward of the village, which is a shipping place for iron ore. There is a small, sandy bay eastward of the village occupied by the boats of the tunny fishery.

La Ghingetta.—La Ghingetta, 10 feet above the sea, and surrounded by rocks above and under water, lies about $\frac{1}{2}$ mile west-southwestward of Torre Caserma Doganieri; there is a depth of about 4 fathoms between these and some rocks off the shore, but the channel is very narrow.

Light.—An unwatched flashing red light is shown from an iron trellis tower, 33 feet high, erected on La Ghingetta Islet, visible 7 miles.

Capo Altano.—A steep cliff extends from Punta Nigra to Capo Altano, 375 feet above the sea, for a distance of $1\frac{1}{2}$ miles, and continues for some distance beyond the latter; a few rocks are scattered along the shore, and the cape has a depth of 6 fathoms close off it, but northeastward of the cape and 800 yards from the coast is a shoal 1.7 miles long, with depths of 8 to 16 feet over it.

—**Isolotto Pori (Meli).**—About $\frac{1}{2}$ mile to the westward is Isolotto Pori, or Meli, rugged and 36 feet above the sea, occupying, with the foul ground about it, a space of about 700 yards in a north and south direction; the eastern side of the island has the least shoal ground off it, and the channel between the island and the cape, except for the shoal just mentioned, has a depth of about 4 fathoms. The light on La Ghingetta is obscured over Isolotto Pori (Meli).

Isola di Sant' Antioco, separated from the main island by the narrow boat channel before mentioned, and forming the western side of Golfo di Palmas, is nearly 10 miles in length in a north and south direction and 5 miles east and west. The northwest and southeast sides of the island are indented, otherwise the coast is, in general, of a regular outline, and the western coast tolerably bold and steep-to, the circumference of the island being about 30 miles.

The island has a considerable amount of level land on the north and east and in many places is well cultivated; the greatest elevation, Monte Perdas de Fogu, 889 feet above the sea, is nearly central, and over the southern cape, Monte Arbus, rises to a height of 755 feet. There are two villages, Calassetta at the northern point and Sant' Antioco (ancient Sulci) on a hill near the causeway.

The inhabitants of Calasetta are of Genoese origin, and those of the latter village are of Sardinian; a large number dwelling in caverns or grottoes supposed to have been used in early times for sepulchral purposes. The eastern coast of the island to Cape Sperone, the south point, has already been described.

Capo Sperone, a low and rocky projection, is backed by a cluster of wooded hills terminating in small plains, with several streams running down the valleys; there are some wells near these, but no great quantity of water can be obtained.

Signal station—Semaphore.—A semaphore is established upon Capo Sperone, at an elevation of 574 feet above the sea.

Radio.—There is a radio station, open always to the general public on Capo Sperone; call letters M P N.

Secca Pomata.—In the latter part of the year 1867 a shoal was reported to have been found by the coral fishermen to the westward of Capo Sperone, having over it about 17 feet water. No such shoal was found during the Italian survey of 1880, but a coral rock of 7 fathoms was found $2\frac{3}{4}$ miles 256° from that cape with deep water around it. Caution is therefore necessary when navigating in the vicinity.

West coast.—From Capo Sperone a steep rocky coast bounds the western side of the island to Punta Maggiore, a distance of 8 miles; Cala Sapone, $3\frac{1}{4}$ miles from Capo Sperone, is fronted by a few rocks and gives shelter to fishing boats. One mile northward is a larger inlet named Cala Lunga, about $\frac{1}{4}$ mile deep, with cliffy sides, but a sandy beach at the head, into which flows a rivulet from the northern foot of Monte Perdas de Fogu; at the entrance the depth is 3 fathoms, and on both sides some rocks lie a short distance out.

Half a mile southward of Punta Maggiore is Isolotto Mangiabarca, small and bold, with a boat channel 300 yards in breadth between it and the island; about $\frac{1}{2}$ mile westward from this islet is a shoal of foul ground, on which are 8 fathoms, with 13 fathoms close around it.

Coast.—The northwest coast of Sant' Antioco is steep and rocky, though not high; it is broken by three bays with sandy beaches, in the center one of which are salt marshes; about 200 yards outside of the western point of this bay are some rocks. Secca delle Saline, awash with about 7 fathoms, is close outside them.

Calasetta, a village with a population of 1,451, may be recognized by a cylindrical tower 95 feet above the sea, and by its church, which has a large white cupola; northeastward of the tower is Isolotto Francese.

Anchorage.—The anchorage for small vessels is in $2\frac{1}{2}$ fathoms, 700 yards from the land, with the town bearing 258° .

Communication.—A post is sent overland to Sant' Antioco.

Supplies of fresh provisions in moderate quantities may be procured; water from a well near the Marina is brackish.

Coast.—From the extreme northern point of the island the low embayed shore trends for a distance of about $2\frac{1}{4}$ miles in an east-southeast direction to Punta Stagno Sirdo (Cirda), nearly joins Punta Dritta on the main island, and then bends around for $3\frac{1}{2}$ miles to the causeway. Dry sand banks nearly connect Punta Stagno Sirdo and Punta Dritta and form an extensive basin between them and the causeway, having depths of from 1 to 7 feet over it; a few perches mark the navigable channel for the passage of the country boats.

A flat of similar depth borders the northern side of the island, beyond which are scattered shallow patches extending toward the bar described later on.

Isola di San Pietro, separated from Isola di Sant' Antioco by a channel 2 miles wide, is about $5\frac{1}{2}$ miles long and 4 miles broad. The western coast is bold and cliffy, with a few hidden dangers; the central and northern part is rough and hilly, with some cultivation; toward the south it is more level and produces, in sheltered localities, vines, figs, and olives, but little grain.

The greatest elevation, named Monte Guardia dei Mori, 692 feet above the sea, is in the northern part. There is one small lake of good fresh water on the western side $\frac{1}{2}$ mile southward of Cala Vinagra, and on the eastern coast, upon both sides of Monte Riciotto, are several brackish lakes and salt marshes.

San Pietro, known to the ancients as the *Insula Accipitrum*, was colonized in 1737 by ransomed captives from the African coast, between which date and 1798 it suffered many alarms and losses from Algerine pirates.

Punta Colonne, the southern point of San Pietro, is remarkable for the rocks which lie off it; they rise perpendicularly from the water at nearly equal distances apart, having the appearance of some vast structure; these, with a projecting rocky tongue extend 600 yards southward of the point.

In the bay, $\frac{1}{2}$ mile westward, is a small island named Genia (Genio), 600 yards south-southwestward of which is Secca di Genia (Genio), a rock with 1 fathom water over it, with 8 fathoms, 200 yards outside, but shallow toward the island.

Punta Spalmatore, with red cliffs, is situated $2\frac{1}{2}$ miles northwestward of Punta Colonne, and from it a rocky shelf, with 14 feet water over it, extends about 700 yards from the shore in a northerly direction, and partly crosses the adjacent bay of Spalmatore Grande; in the northern and larger indentation are several rocks, both above and under water, about 300 yards from the shore.

Capo Sandalo lies about $2\frac{1}{2}$ miles northwestward of Punta Spalmatore, and Isolotto Gallo, 30 feet above the sea, steep-to on the

outside, is situated westward $\frac{1}{2}$ mile from the cape, with a passage with depths of 14 and 16 fathoms between it and the shore.

Light.—On a rise a little within the cape is a red circular tower, with two galleries and surmounting a dwelling, the whole 100 feet in height; it exhibits at an elevation of 439 feet above the sea a flashing white light. It is visible 28 miles. (For arc of visibility, see Light List and Chart.)

Coast.—Punta Burrona, about $1\frac{1}{2}$ miles to the northward of Capo Sandalo, has a rock, with 10 feet water over it, lying 200 yards off its northern projection. Cala Vinagra, $\frac{1}{2}$ mile eastward of Punta Burrona, has an inlet in the center affording some protection to a narrow inlet, where upon an elevated rock is a deserted tower; there is also a chapel adjacent.

Punta delle Oche is situated $1\frac{1}{2}$ miles eastward of Cala Vinagra and Isolotto del Agua, 52 feet high, lies in the bay westward of it; a short distance off Punta delle Oche there is a rock with $1\frac{1}{2}$ fathoms water over it.

Depths offshore.—Along the western coasts of the islands of San Pietro and Sant' Antioco, 20 fathoms over a bottom of rock and coral, will be found at 1 mile off; the water then deepens abruptly, and at 9 and 10 miles distant there is no bottom at 100 and 200 fathoms.

Coast.—Half a mile southward of Ciminiere Punta, the extremity of La Punta, the northeastern promontory of the island, is Cala Lunga, with several rocks about the entrance; the shore around the northeastern point of the island is foul for a distance of 300 yards, but at $\frac{1}{2}$ mile distant there is a depth of 12 fathoms.

Tunny fishery.—Tunny nets are laid out during the season, March to November, near Cala Lunga; they extend north-north-westward for a distance of about 1,400 yards from the shore. The outer end is marked by day with a buoy and by night with a boat exhibiting a white light. (See Caution, p. 60.)

Canale di San Pietro.—The eastern coast of San Pietro is low, and forms several small bays with sandy beaches, and the whole as far as Punta Gerino (under Monte Riciotto) is fronted by a flat of dry sands and shallow patches, which extend across the channel.

Within the bar thus formed having an average breadth of 2 miles, there are bights and gullies of deeper water, but no channel for a large vessel exists; no stranger should attempt it without an efficient pilot. On the south the channel on both sides is bold until within Punta Nera on the one hand and the northern end of Sant' Antioco upon the other.

On La Punta are some houses forming the hamlet of Scabeccieri, and $2\frac{1}{2}$ miles southward is the town of Carlo Forte, beyond which are

several salines and stagnant lagoons terminating at Punta Nera, a dark headland $\frac{3}{4}$ mile to the eastward of Punta Colonne.

Light.—From the end of the leading jetty at Carlo Forte is exhibited, from an iron column over a square house, the whole 23 feet high, an occulting red light. It is elevated 31 feet above the sea, and is visible 6 miles. (See Light List.)

Isola Piana, nearly $\frac{1}{2}$ mile eastward of Ciminiere Punta, is rocky, 62 feet above the sea, about 1 mile in circumference, and triangular in form, with a bold rock named La Catena lying off its northern point. Upon it is a church surmounted by a large cross, and some dwellings and a large tunny factory, colored white, are upon the southeast coast.

Isolotto dei Topi, a little to the southward, is smaller, 20 feet above the sea, and affords pasture for a few sheep. The channel between these islets and the shore is too much obstructed to be used by any except the coasting vessels of the country with local knowledge.

Secca Grande, a dangerous rock, lying 1 mile northeastward from the northern end of Isola Piana, is about 400 yards square. The shallowest spots have 9 to 14 feet water over them and the shoal is surrounded by depths of 7 fathoms. From the shoal of 9 feet Torre Porto Scuso bears 94° , distant 2 miles.

The light on La Ghingetta Islet, Porto Scuso, is obscured over the Secca Grande.

Lightbuoy.—A buoy, with black and red horizontal stripes, exhibiting a flashing white light is moored about 380 yards southeastward of Secca Grande. (See Light List.)

Secca Martin, 600 yards northeastward of Secca Grande, has $3\frac{1}{2}$ fathoms water over it, and Secca del Sardo, with a similar depth, is a small rock with 6 to 7 fathoms water around it and lies $\frac{1}{2}$ mile southward of Secca Martin.

Secca Arena, a shoal about $\frac{1}{4}$ mile in extent, and having 13 feet least water, lies 1.8 miles, 220° , from Torre Porto Scuso. Nearly on the same line of bearing, but at a distance of $1\frac{1}{4}$ miles from the tower, is a rocky head having 20 feet water.

Buoys.—The following are moored on the western side of the channel leading from the south to the north anchorage, which has a depth of 13 feet in it.

A conical iron buoy, painted red and white in horizontal bands, with the name "Carloforte S" in black. The topmarks are two white cones with bases together in 26 feet water, 1.1 miles 109° from Torre San Vittorio.

A buoy, similar to the preceding, in 20 feet water 1,200 yards 83° from Torre San Vittorio.

A buoy, similar to the preceding, $1\frac{1}{2}$ miles 39° from Torre San Vittorio.

Three buoys, each a conical iron buoy, surmounted by a staff with two cones, bases together. The buoys and staffs are painted red and white in horizontal bands, with the inscription "Carloforte N" in black; topmarks white. They are moored with Monte Riciotto in range with Torre San Vittorio, bearing 209° , and distant, respectively, from the tower 1,600 yards, 1.8 and 2.5 miles.

A red and black horizontally striped buoy, with the name "Marmi" in white, surmounted by a red spherical topmark, lies southward of Secca dei Marmi, and is 1.3 miles 73° from Torre San Vittorio.

A horizontally striped red and black buoy with a red spherical topmark and the name "Palo" in white, lies westward of Secca del Palo in 15 feet of water, and is $1\frac{1}{2}$ miles 39° from Torre San Vittorio.

A red buoy, privately owned, lies on the western extremity of North Anchorage, and 1,700 yards southward of Isolotto Topi.

Submarine telegraph cable.—A telegraph cable crosses the channel from a position $\frac{1}{2}$ mile southward of Ciminiere Punta to Porto Paglietta, on the mainland.

Pilots.—Pilots will board vessels to which they are called 2 miles from Carlo Forte, and conduct them to the anchorage.

Anchorage.—Secure anchorage can, with ordinary precaution, be readily obtained by every class of vessel, under all circumstances, within the shelter of Isola San Pietro. That to the southeastward of the island is the best adapted for strangers and vessels of deep draft, and especially for sailing vessels obliged to run with the strength of a northwest gale; the sound is open to winds from the south and southwest, but these rarely blow, and the sea does not enter; from the northward it is completely broken by the numerous banks previously described.

The anchor may be let go whenever the vessel is northward of the parallel of Punta Nera, either in 11 fathoms water, off that point, with Punta Colonne high rock bearing 245° , and Torre San Vittorio 341° ; or farther in, with the latter 296° and Punta Nera 230° , in a depth of $5\frac{1}{2}$ fathoms.

The north anchorage is better sheltered, but, as the bottom is irregular, local knowledge is desirable for large vessels. The best berth is in $5\frac{1}{2}$ fathoms water with Torre San Vittorio bearing 203° and the extremity of La Punta 298° , about $1\frac{1}{2}$ miles from the shore. If desirable, an anchorage may be obtained on the eastern side in depths of 7 or 8 fathoms with Torre Caserna Doganieri (Porto Scuso) bearing 22° , and the extremity of La Punta 271° , but there is no shelter should the wind shift to the northwest; and there are the two patches before mentioned to be avoided. Small vessels can

approach the town of Carlo Forte to the distance of $\frac{3}{4}$ mile, where they will have 18 feet water.

Directions.—The anchorage in the roadstead southward of Isola San Pietro is easy of access in a northwest gale, but, when running for it, it is well for a sailing vessel to keep to windward, as the island is not readily distinguished in the offing, being blended with the high land behind it. On approaching the coast the western face of the island shows well from its rough and red appearance, and the light-house on Capo Sandalo is a good landmark either by day or night.

The southern entrance is easy, the channel being nearly 2 miles broad, with a central depth of from 10 to 20 fathoms. If the wind be favorable it is only necessary to keep in mid-channel to reach the best anchorage; but if (as is often the case) it becomes scant as the island is approached endeavor to pass close to Punta Spalmatore, but not within $\frac{1}{2}$ mile of Punta Genia, in order to avoid the spit of rocks off it, and having cleared the rocks off Punta Colonne, either anchor off Punta Nera, or proceed to the positions before mentioned.

The only dangers to be avoided by a sailing vessel when working to windward are the Secca di Genia, and the Secca delle Saline, the latter about 300 yards from the land on the eastern entrance. Torre Calasetta, in range with the western part of Monte San Michele, bearing 69° , leads to the southward of Secca di Genia; and Punta Barca, in range with Il Toro, bearing 167° , leads to the westward of Secca delle Saline.

Secca Grande divides the northern channel, which is nearly $2\frac{1}{2}$ miles wide, into two passages, the western of which, although narrower, is more direct, and by keeping Torre Calasetta in range with a sugar-loaf-shaped hill, named Scarparino, on the south part of Sant' Antioco, which is easily recognized, bearing 162° , a vessel will pass between Secca Grande and the shoal ground lying 400 yards eastward of Isola Piana, and westward of Secca del Arena; when Torre San Vittorio is in range with a gap westward of the peak of Monte Riciotto bearing 210° , the vessel will then be in 5 fathoms water, and can either anchor or proceed 700 yards farther in toward Monte del Gardo, and anchor on the marks before given.

The light on La Ghingetta Islet, Porto Scuso, is obscured over the Secca Grande.

Carlo Forte.—The town of Carlo Forte—named after Charles Emmanuel III, King of Sardinia, the patron of the colony—was founded about 1737; on account of the incursions and depredations of the Moors from Tunis it was surrounded by a wall inclosing a considerable space, and defended by fortifications, including the strong redoubt of San Vittorio, on the point a little southward of it.

There is a church, and a fine statue of the sovereign on La Marina. Carlo Forte contains a population of about 7,693, and has some com-

mercial importance on account of the shipment of mineral ores from the neighboring mines. Salt, coral, lead, and manganese are also exported.

Communication.—The steamer between Cagliari and Porto Torres calls every week, and there is a daily steamer to Porto Vesme; telegraphic communication at limited hours.

Coal and supplies.—About 6,000 tons of coal are imported annually, and a small quantity might possibly be obtained; there are 20 lighters, each capable of holding 10 tons.

Supplies of fresh beef, bread, fowls, and eggs can be obtained by giving notice, but vegetables and fruit are scarce. Quail, partridges, woodcock, and rabbits are numerous in the season. Water is scarce, the population being dependent on their cisterns. Small quantities may be obtained from the wells near Torre San Vittorio and at Porto Scuso.

Punta Rama, 9 miles to the northward of Capo Altano, is a projecting headland, which shelters Cala Domestica, a small inlet eastward of it; a tower named after the inlet is on the headland; between Capo Altano and Punta Rama is a bay 3 miles deep, entirely open to the westward; near the head is the sandy inlet of Porto Paglia, within which, on a southeastern elevation, are a fishing village and tunny factory, with a tower on a low point to the southward. The shore around the entrance to Porto Paglia is foul for the distance of about $\frac{1}{2}$ mile.

Fontana Mare lies at the head of the bay, and is marked by a group of ruined sheds with a conspicuous white chimney; the stream of the same name runs into the bay here. Beyond the mouth of the stream the coast becomes bold and elevated into cliffs, with steep falls from the mountains behind. Several small islets lie off the shore, the largest being Pan di Zucchero (Pan del Ciel), of conical form. In this bay there are depths of from 30 fathoms water at the entrance to 10 fathoms about $\frac{1}{2}$ mile from the shore.

Tunny fisheries.—Tunny nets are laid out, during the season, March to November, northward of Capo Altano; they extend about 1 mile in a west-northwesterly direction. Nets are also laid out from the coast about 4 miles northeastward of Capo Altano; they extend about 1,400 yards in a northwesterly direction. The outer end of the nets is marked by day with buoys and by night with a boat exhibiting a white light. (See Caution.)

Iglesias.—About 6 miles northeastward from Capo Altano is Monte San Giovanni, 1,286 feet above the sea; it is surmounted by a tower, and on both sides are streams flowing down to the bay 1 mile northward of Porto Paglia. Round the slope of the mountain winds the main road to the walled town of Iglesias, which contains a

cathedral, palace, several convents, and a Jesuit college, and is situated about $4\frac{1}{2}$ miles from the sea and rising above it 1,059 feet.

The soil is little adapted for cultivation, but there is some trade in wine. It is surrounded by a rich mineral district, Monte Ponì mine, 1 mile southwestward, being the most productive lead mine in the island.

Communication.—Iglesias has railroad communication with Cagliari and with Montefiore, Gonnesa, and Porto Vesme; also telegraphic communication.

Capo Pecora lies 5 miles in a northerly direction from Punta Rama, the coast between forming a bay, the shore of which is similar to that to the southward. Punta dell Guardianu, a peak 1,555 feet above the sea, is $1\frac{1}{2}$ miles eastward of Capo Pecora. The bay is $1\frac{1}{2}$ miles deep, with a long sandy beach at the head, $\frac{1}{2}$ mile within the southern end of which is San Nicolo Chapel; near the north is the mouth of the Flumini Maggiore, a considerable stream passing a town of that name 4 miles from the coast.

Anchorage.—Close off the sharp point of the cape there are two rocks, but the shores of the bay are otherwise bold-to, with depths of 24 fathoms at the entrance to 4 and 5 fathoms close in. Under favorable circumstances anchorage may be obtained $\frac{1}{2}$ mile from the mouth of the river in about 7 fathoms water.

Buggerru.—The town of Buggerru, a little inland, has a population of about 6,000 and is the chief center of this mining district.

Communication.—There is telegraphic communication at limited hours.

Supplies of fresh provisions in moderate quantities may be procured, and water of fair quality obtained from a spring.

Coast.—The coast northward from Capo Pecora to Capo Frasca, a distance of 19 miles, is of an irregular outline composed of cliffs broken by small inlets, and along the southern portion there are large quantities of sand rising into barren hillocks, presenting a dreary aspect; northward the country is more cultivated and enlivened by farms and other habitations, the whole being backed by rugged mountains and interspersed with many rivulets.

Three and a half miles inland and about midway between the two capes is Monte Arecuentu, or Pollice di Oristano, a remarkable peak 2,572 feet above the sea. The district abounds in minerals, especially lead.

There are few dangers, and the depths are gradual from about 30 fathoms at 3 miles to 10 fathoms at $\frac{1}{2}$ mile from the shore. Round the bold head of Capo Pecora and for $1\frac{1}{2}$ miles to the northeastward there are a few rocks a short distance from the shore; thence for 4 miles the shore is nearly straight and chiefly of sand to Fiume Zapiani, where it again rises into cliffs without any particular character for $7\frac{1}{2}$ miles to the inlet of Flumentorgiu.

In this small bay are a tunny factory, a chapel, and a battery; it has a sandy head, but off the entrance are a few rocks and a sunken one, detached, 400 yards from the head a little northward. About $1\frac{1}{2}$ miles northward from the bay is Torre Flumentorgiu, on a point and 200 feet above the sea; thence a bold coast extends to Capo Frasca, forming (from the pinnacle over a little cove on the south) the cultivated, level promontory of Santadi.

Tunny fishery.—Tunny nets are laid out, during the season, March to November, from near Torre Flumentorgiu. They extend in a westerly direction for a distance of about $1\frac{1}{2}$ miles from the coast; the outer end of the nets is marked by day with a buoy and by night with a boat exhibiting a white light. (See Caution, p. 61.)

Golfo di Oristano, within the Capes Frasca and San Marco, is the largest bay on the west coast of Sardinia; it is of an oval shape, extends 11 miles in a north and south direction, and is 5 miles deep; the entrance points are $5\frac{1}{2}$ miles apart. The shore round the bay is formed of a beach bounding a succession of large lakes, which communicate with the sea by either natural or artificial channels, and the abundant fish with which they are stocked is a profitable and staple source of trade.

Beyond the salt lakes are richly cultivated plains, terminating the broad and fertile valley which extends across to Golfo di Cagliari. The country is studded with numerous villages, farms, olive plantations, and vineyards; and in the neighboring northern district of Milis, by the famous orange groves. Sloping to the campidano are mountain ranges, their summits at a distance of 10 and 15 miles from the coast; on the north Monte Ferru with Monte Urticu, a crater, elevated 3,440 feet; upon the east Monte Sa. Trebina, 2,605 feet above the sea, and the tabled heights of Monte Arci; and on the south the rugged peaks of Monte Arcuentu, with the remarkable formation before mentioned.

Numerous vestiges of antiquity testify to Oristano and its neighborhood having held a highly favored position, but its proximity to so much stagnant water, and a want of proper drainage, result in such unhealthfulness that, except during the winter and the spring, the shores of the bay are dreary and desolate in appearance.

Coast.—From Capo Frasca the coast turns to the southward for a distance of 3 miles to the entrance to Stagno di Marceddi, and midway is Torre Frasca, cylindrical and 20 feet above the sea; there is also a beacon on Capo Frasca. Torre Marceddi stands on the eastern entrance point. This lake is about 5 miles in length in a southeast direction; near the head on the southern side are the remains of ancient Neopolis and of a Roman causeway, also the chapel of Santa de Nabui.

From Torre Marceddi the beach curves for $6\frac{1}{2}$ miles to the mouth of Stagno di Sassu, passing Punta del' Arena, a long sandy spit, and an uncultivated waste between. This, the largest of the lakes and abounding with fish, extends 7 miles in length in a southerly direction, where, at its head, Fiume Mogoro enters it, flowing by the adjacent villages and vineyards of Terralba and Marrubiu, in the latter of which are vestiges of Roman baths.

Fiume Tirso, the principal river of the island, enters the gulf by a broad outlet $3\frac{1}{2}$ miles northward of that of Stagno di Sassu, the intervening space being occupied by Stagno di Santa Giusta and several smaller lakes; on the eastern bank are a village and chapel of the same name, and farther eastward the village of Palmas on the borders of the Campo di Sant' Anna.

Within the mouth of the Fiume Tirso are several islets, and a communication with Stagno di Santa Giusta, and although the chief river of the island, it here becomes fordable in very dry summers. It has a tortuous eastern course of 12 miles to the foot of the hills through a highly cultivated district with many villages on the northern side; on the left bank, 3 miles from the shore, is the walled town of Oristano.

From the entrance to Fiume Tirso the beach sweeps around to the northward and westward; on the shore $1\frac{1}{2}$ miles from the entrance and at the end of a road leading to the town is Torre Grande (Gran Torre); westward of the tower the beach fronts Stagno di Cabras and Stagno di Mistrise, 5 miles in length and breadth, but of an irregular outline.

Along the western bank of Stagno di Cabras are numerous *noraghe* or ancient monuments on slightly elevated ground, and upon the eastern shore, $1\frac{1}{2}$ miles from Torre Grande, is the pretty village of Cabras, containing a population of 4,209, and a conspicuous church with a cupola.

Capo San Marco, a narrow rocky point, projects southward and forms the northern extremity of Golfo di Oristano; it is noted for its numerous remains of the ancient Grecian city of Tarras and the earlier and rude *noraghe* dwellings. The site is marked by Chiesa di San Giovanni, 167 feet above the sea, circular, white, and conspicuous, $\frac{1}{2}$ mile southward of which is Torre di San Giovanni di Sinis, near which is a fountain, whence a small supply of water can be obtained; nearer the coast are some sepulchral excavations in the limestone rock.

Light.—A lighthouse is being built on Capo San Marco.

Mooring buoy.—A gray cylindrical mooring buoy lies about 400 yards southward of Torre Grande.

Anchorages.—The entrance to the bay being open to the westward, winds from that quarter in winter occasionally send in a heavy

sea and surf; with offshore winds there is excellent anchorage and vessels could always find security within the points in 6 and 7 fathoms water.

Eastward of Capo Frasca there is anchorage, in about 7 fathoms water, with Torre Frasca bearing 192° . Small vessels may anchor closer inshore in $3\frac{1}{4}$ to $3\frac{3}{4}$ fathoms, with Torre Marceddi bearing 154° and Torre Frasca 229° .

Off Torre Grande the anchorage, in 6 fathoms water, is about 1 mile from the shore, with Torre di San Giovanni di Sinis bearing 256° , and small vessels may anchor closer in at about 900 yards from the shore, in $3\frac{1}{2}$ fathoms, with the same tower bearing 249° .

Anchorage may also be obtained eastward of Capo San Marco, in 6 fathoms, over weeds, about 900 yards southeastward of Torre Vecchia.

Depths offshore.—The shores of Golfo di Oristano are bordered by a flat at very unequal distances from it; off the entrance points a reef extends a short way out, but the shallow flat, included within 3 fathoms, extends generally over 1 mile from the beach, and at the northern part of the bay, between the entrance to Stagno di Sassu and Fiume Tirso, over 2 miles. Off this part are three detached banks, with 13 and 16 feet water; they are about $1\frac{1}{4}$ miles from the shore, with a channel of about $3\frac{1}{2}$ fathoms between. Over the bay generally there are depths of from 12 fathoms at the entrance to 8 and 6 fathoms within.

Oristano was founded in 1070 by the inhabitants of Tarras, their former position being found too exposed to the incursions of the Barbary pirates. It is the chief town of the Province and contains a cathedral with an elevated octagon campanile, several other churches, convents, and a hospital. The produce of the district is oil, grain, flax, oranges, and salted fish; these are shipped from a small mole near Torre Grande, where also is the customhouse. Water is scarce, although so near a river, the inhabitants being chiefly dependent for their supply on cisterns. The population is 7,107.

Communications.—The steamer running between Cagliari and Porto Torres calls every week, anchoring near Torre Grande. Oristano is a station on the railroad between Cagliari and Terranova, and there is telegraphic communication; the telegraph office is open till 9 p. m. A good macadamized road runs to the northward and southward of the island.

Cabras has telegraphic communication at limited hours.

Supplies.—Cattle and provisions can readily be obtained; fuel is, however, scarce, as also is water in summer.

Capo Mannu, 11 miles northward of Capo San Marco, is of an irregular outline, clifly, 157 feet above the sea, and declining to the eastward and wedge-shaped; on the southern head is Torre Mora and on the northern the round white tower of Mannu.

Isolotto Mal di Ventre, $3\frac{1}{2}$ miles west-southwestward of Torre Mora, is a flat and rocky islet 59 feet above the sea, $1\frac{1}{2}$ miles in length in a northeastern and southwestern direction, narrow, and with a reef extending for 1 mile off both ends in similar direction; the southwestern reef is terminated by isolated rocks named The Twins. Outside the reef, on which are several rocks above water, the water is deep.

Il Catalano, a small black rock, 36 feet above the sea, lies 6 miles southward from the southern point of Isolotto Mal di Ventre; it is bold on all sides. At about 1,200 yards north-northeastward of Il Catalano there is a rock with $1\frac{1}{2}$ fathoms water over it, and at 2.3 miles in the same direction another rock on which the depth is $4\frac{1}{2}$ fathoms, and southwestward, distant 1.2 miles from Il Catalano, a rock with $6\frac{1}{2}$ fathoms water over it. The latter is known locally as Coscia di Donna.

The channel between The Twins and the northern rock from Il Catalano is about $2\frac{1}{2}$ miles wide, with depths of from 15 to 20 fathoms in the center; the channel between Il Catalano, the dangers off it, Mal di Ventre and the shore, is from 3 to 4 miles in width and can be safely navigated by any class of vessel, the depth being from 9 to 20 fathoms. Passing between the islets a vessel should keep over toward the rocks which are seen above water on the Mal di Ventre Reef.

Coast.—Capo Marargiu lies $18\frac{1}{2}$ miles northward from Capo Mannu, and between is a large bay about 4 miles deep, separated unequally into two by a point on which is Torre Nieddu; except in the southern part the shores are bold to within a moderate distance from the shore, 7 fathoms being the least depth at 1 mile off; across the entrance there are from 40 to 50 fathoms. The land within is high, the volcanic crater of Monte Ferru sloping from a distance of 6 miles from the coast to the streams and valleys about halfway, and the mountains above Bcsa sloping down toward the river and plain of Murtas.

About $\frac{1}{2}$ mile eastward of Scoglio Peloso, northeastward of Capo Mannu, there is a shoal with $2\frac{1}{2}$ fathoms water over it off the entrance of a small bay, and for about 4 miles to the eastward the 5-fathom curve is nearly 1 mile distant from the shore.

On the northern point of the small bay of Cageragas (Santa CATERINA), about 6 miles eastward of Capo Mannu, is Torre Pittinuri, 423 feet above the sea, and 3 miles northward, Torre Nieddu is 217 feet; on a bold head 1 mile northward of Torre Nieddu is Torre

Foghe, 233 feet above the sea; deep ravines are here scored out of the mountain lava by the winter torrents; in a small cove immediately southward of Torre Foghe is the mouth of Fiume Mannu. On the northern slope, elevated 1,340 feet above the sea, surrounded by woods, are the town and castle of Cuglieri. Fruit is abundant.

From Torre Foghe a cliffy and indented coast trends in a north-northeastward direction for 7 miles to the mouth of Fiume Bosa or Temo, having at $1\frac{1}{2}$ and 3 miles distant Ruia and Colombargia Towers, 167 and 108 feet, respectively, above the sea; around the head a little northward of the former are several rocks above water, and $1\frac{1}{2}$ miles eastward of Torre Ruia is Santa Vittoria Chapel. An islet lies off the north point near Torre Colombargia, with 20 fathoms close outside, and beyond it, about 2 miles inland, is the town of Tres Nuraghes, these singular edifices, some of very large dimensions, being thickly scattered over the adjacent plain. The cupola of Tres Nuarghes Cathedral is conspicuous.

Fiume Bosa.—Fiume Bosa or Temo (ancient Temus) flows from around and northward of Monte Leone, and receiving many tributaries from the eastward, passes under a bridge of seven arches, and disembogues in the bay, 1.3 miles westward of the town to which it is navigable for boats. Off its mouth is the fortified Islo Rossa.

Porto di Bosa.—A breakwater joins Isola Rossa and the southern side of the entrance of Fiume Bosa. From the shore, at a distance of 550 yards to the southward of the entrance of Fiume Bosa, a breakwater extends in a southwesterly direction, and is above water for a distance of 220 yards. Between these two breakwaters is formed the port of Bosa, with depths of from 13 to 16 feet in the center, and 10 to 13 feet near the breakwater.

Dredging was commenced in 1913 in the entrance to Porto di Bosa during the daytime only; the dredger is removed at night.

Wreck in entrance—Buoy.—The wreck of the steamer *Gina* lies sunk in the entrance to Bosa Harbor, 340 yards 148° from the light on Isola Rossa.

The wreck is marked by a bottle-shaped buoy, painted white, moored 350 yards 148° from the same light.

A fixed white light is exhibited 16 feet above the sea from the mast of the wreck.

Light.—An iron post, surmounting a shed, the whole 53 feet in height and situated on the southeastern point of Isola Rossa, which forms the head of the breakwater, exhibits an unwatched occulting white light, at an elevation of 84 feet above the sea, which is visible 6 miles. (See Light List.)

Town.—Bosa, containing a population of about 6,800, is beautifully situated on the north of the river, which is bounded upon both sides by table hills; behind is an olive grove, and upon an elevated

site Sant' Andrea Church is inclosed within ancient walls with towers. It is the capital of a district, contains a cathedral, several churches and convents, none of any particular note, but having rather an imposing appearance from the offing.

Like most similarly situated places, the town is unhealthful and is screened from the refreshing influence of the sea breeze. Timber for shipbuilding purposes is exported from the forests round the foot of Monte Ferru and shipped from Cala Pietra Niedda, 1 mile south of Bosa.

The country around Bosa is fertile and produces a considerable quantity of oil and wine. On the left bank of the river is San Pietro Chapel, said to mark the site of the Roman town of the same name. Beyond are many villages scattered over the Planargia, including the town of Tres Nuraghes, near which is a stream.

Communication.—A weekly steamer to Cagliari, Porto Torres, and intermediate ports; Bosa is connected at Macomer with the main line to Cagliari; telegraphic communication at limited hours.

Supplies of fresh provisions may be obtained; water is scarce and not very good.

Capo Marargiu.—From the mouth of the river, a succession of indented trap cliffs extend for 5 miles northwestward to Capo Marargiu; midway is Torre Argentina, 108 feet above the sea. A few rocks lie off the intervening shore, and an islet of moderate height outside the cape; about 700 yards west-southwestward of the cape is a rocky shoal with $2\frac{3}{4}$ fathoms water over it. The coast beyond is bounded by steep cliffs, the land sloping up to Monte Tarattala, which is 2,556 feet, and 3 miles northward of the cape Monte Mannu is 2,635 feet above the sea.

Porto and Punta Poglina.—Nine miles northward of Capo Marargiu is the rocky port and beach of Poglina, a favorite resort of the coral fishermen, and $1\frac{1}{2}$ miles westward from the port is the point of the same name. At the base of this projection is a bare rock, and on an elevation, a little within the point, a tower 213 feet above the sea, whence the coast trending in a northern direction for the city of Alghero is low and rocky, backed by cultivated hills of moderate elevation.

Water.—In Cala Cantaro a supply of good water can be procured from a spring halfway up the hill; it is a little southward of Cala Buona, the resort of the boats of the coral fishery.

Rada di Alghero.—From the point on which the city of Alghero is built, nearly 4 miles northward of Punta Poglina, the coast turns to the westward, to Capo Caccia, the extreme headland, which bears 270° , and is distant 7 miles; between are two bays, the eastern Rada di Alghero, the western Porto Conte. Rada di Alghero is 3 miles wide across the entrance to Capo Galera and about 2 miles deep; its

eastern shore is low and sandy, with a shallow lake, named Stagno di Calich, at the head; the western is rocky, broken by points or projections from Monte Doglia, 1,430 feet above the sea. The land about the bay is well cultivated and an extensive plain (covered with the fan palm) runs northward to the shores of Golfo dell' Asinara.

Within Capo Galera are a tower and lazaretto.

Isolotto Maddalena.—On the eastern side of the bay is Isolotto Maddalena, rocky, 13 feet above the sea, with a ruined chapel on it; it lies about 1,200 yards from the shore, and nearly on the boundary of the shallows projecting from it, which extend from the town to the head of the bay. Upon this flat, and over the rocky spit lying 700 yards northwestward of the town, there are from 9 to 15 feet water; the western shore is less shelving, and over the bay there is a gradually decreasing depth from 15 fathoms at the entrance, to about 5 fathoms at 400 yards from the western side.

Alghero.—The city of Alghero is built upon a low rocky point jutting out from a sandy beach; its medieval walls are surrounded on three sides by the sea, and entered by two gates, one being on the northern side, near the landing place. It was long a favorite possession of Spain, and once the principal station for trade with Genoa, and contains a population of 10,741.

Light.—On the northwest bastion at Alghero a small circular tower, 21 feet in height, exhibits, at an elevation of 46 feet above the sea, a fixed white light, visible 4 miles. (See Light List.)

Secca del Traditore, with 1 fathom water over it, lies 500 yards westward of this point.

Communication.—A steamer every fortnight to Cagliari, Porto Torres, and intermediate ports, a railroad to Sassari, and telegraphic communication. The telegraph office is open till 9 p. m.

Supplies of fresh provisions are abundant, but water is scarce.

Trade.—Alghero is one of the chief resorts for the boats engaged in the coral fishery, and exports, besides that article, wine, wool, tobacco, and anchovies. The silky filaments of the *Pinna marina* has also afforded a branch of trade, being woven into gloves both at Cagliari and Naples.

Stagno di Calich, at the head of the bay, receives the streams of the rivers Cantarella from the north and Serra from the east: from the lake abundant supplies of fish are procured. Over the entrance channel there is a rudely constructed bridge of several arches.

Anchorage.—There is good holding ground about $1\frac{1}{2}$ miles northwestward of the town in from 8 to 10 fathoms water, where a convenient summer anchorage may be taken up.

Small vessels anchor in about $4\frac{3}{4}$ fathoms water, over weeds, $\frac{1}{2}$ mile north-northwestward of the lighthouse and southward of Isolotto

Maddalena; there is also anchorage about 400 yards to the eastward of Torre Galera, in $7\frac{1}{2}$ fathoms water, over weeds and sand.

Porto Conte, separated from Rada di Alghero by a hilly projection, which trends about 2 miles to the westward to Punta del Giglio, on which there is a tower 295 feet above the sea, is 2 miles wide at its entrance, extends 4 miles in a northeast direction from Capo Caccia, and terminates in a sandy beach; its western shores are rocky and indented. The 5-fathom curve is about 1.3 miles and the 3-fathom curve about $\frac{3}{4}$ mile from the head of the bay, but outside this the shores on both sides are tolerably bold, and the depths are from 30 fathoms at the entrance to 5 or 6 fathoms abreast the customhouse.

Water can be obtained at Porto Conte, and other supplies from Alghero, a distance of 8 miles.

Anchorage.—Although this bay is exposed to the southwest, it is a safe anchorage; large vessels anchor abreast the customhouse in a depth of about 6 fathoms; small vessels find better shelter north-eastward of it, in 3 and 4 fathoms, over a bottom of mud and sand, with some weeds. In winter northwest winds blow with great violence across the plain.

Capo Caccia, a promontory terminating a range of high cliffs, which bound Porto Conte on the west, is 610 feet above the sea.

About 200 yards northward of Capo Caccia, and on the western side of the peninsula, is the entrance to the Grotto of Neptune (ancient Grotta Azzurra); it is a little above the surface of the water, and the face of the rock at the landing place has from 8 to 9 fathoms water close-to.

Light.—On Capo Caccia a white circular tower, surmounting a dwelling, the whole 78 feet in height, exhibits, at an elevation of 610 feet above the sea, a flashing white light; it is visible 28 miles. (See Light List.)

Signal station—Semaphore.—At about 900 yards north-northwestward of the lighthouse on Capo Caccia is a semaphore station, 607 feet above the sea, with which vessels can communicate.

Coast.—Three-quarters of a mile northward of the cape is Isolotto Foradada, 597 feet, and perforated, and 2 miles farther, in the same direction, Isolotto Piana, 351 feet above the sea; both islets are steep. On the highest summit of the cliffs, southward of Isolotto Piana, is Torre Pegna, elevated 918 feet above the sea, and Punta delle Gessiere, so named from the gypsum there obtained, is situated 1.3 miles northward of Isolotto Piana. Capo Caccia may be rounded at any distance, as it is very bold, as well as the coast to Punta delle Gessiere.

Porto Ferru or Girato, $4\frac{1}{2}$ miles northeastward of Punta delle Gessiere, is a small, well-sheltered, boat cove, with a sandy beach at

the head, near which are some ruins; midway is Torre del Porticiuolo, 131 feet above the sea, and there are towers on each entrance point; Rossa, the southern, 610 feet, and Ferru, the northern, 210 feet above the sea. About 1 mile within the port is Barace Salt Lake, into which run several rivulets from the rocky heights of Monte Forte, 1,526 feet above the sea on the north; south and east of Porto Ferru the land is low, and the city of Sassari, 17 miles inland, can be seen over it from the offing.

Capo dell' Argentiera, 10½ miles to the northward of Capo Caccia, is the steep termination of a spur from Monte della Nurra; the land within is covered with brushwood and wild olive trees. A few rocks lie off the north cliffs, but they are close in, and deep water will be found on all sides with 70 fathoms, over coral bottom, at about 4 miles from the cape.

Capo Negro, about 4 miles northeastward of Capo dell' Argentiera, is a table-shaped cliff, and 6 miles farther in the same direction, Isola Porri, 187 feet above the sea, and conical-shaped, lies close to the shore. From Isola Porri the coast trends northwestward for about 4 miles, to Punta Coscia di Donna, which has several rocks, both above and below water, extending from it.

Capo Falcone, the northern extremity of a peninsula which extends from Monte della Nurra, has a tower on its highest summit, 633 feet above the sea; on the southern side of the point a white rocky coast line extends fully 3 miles, sloping southward to a sandy neck, where are several salt lakes.

Isola Asinara (ancient *Herculis Insulæ*), entirely mountainous, with good pasture, and in places covered with the wild olive tree, is inhabited by a few farmers and fishermen; where cultivated the island produces good fruit and corn; tortoises, as well as wild goats abound. It is 9½ miles in length in a northeasterly and southwesterly direction, 3½ miles in breadth at its northern extremity, and very irregular in outline, and nearly intersected in three places by narrow ravines. The principal elevations are Monte Scomunica, 1,335 feet, and La Maestra, 1,273 feet, near the northern end of the island, and Monte Maestra, 876 feet above the sea near the southern extremity.

The southwestern point of Isola Asinara is about 1 mile from Capo Falcone, the sound between being occupied by Isola Piana, which is low, and has a tower on it, the narrow passages on both sides are studded with sharp rocks, on a connecting shallow flat with from 7 to 11 feet over it.

Beacons.—Four beacons of masonry, in the form of truncated cones, and painted black and white in horizontal stripes, are placed near the southwest point of the island for use as range marks through the channel between it and Isola Piana; it is stated that

there is 13 feet water in the passage, but it can not be attempted with any sea.

Light.—At Punta Caprara, or Scorno, the northern point of Asinara, is a white circular tower, surmounting a white dwelling, the whole 117 feet in height, exhibiting, at an elevation of 262 feet above the sea, a flashing white light, which is visible 21 miles. (See Light List.)

Signal station—Semaphore.—At about 900 yards to the southwestward of the lighthouse is a semaphore station, 377 feet above the sea, with which vessels can communicate.

Storm signals are exhibited here.

Depths offshore.—From 20 to 30 fathoms will be found $\frac{1}{2}$ mile off the coast, and the 100-fathom curve is from 3 to $3\frac{1}{2}$ miles distant.

Oliva.—About 3 miles southward of Punta Caprara, at Cala d' Oliva, are the buildings of the convict settlement, and on a small promontory there is a tower, 66 feet above the sea.

Mooring buoy.—A mooring buoy is moored 340 yards 90° from the tower at Oliva.

Rada della Reale.—There are some good boat coves, and a convenient anchorage for shipping in Rada della Reale, on the eastern side of Isola Asinara, within Punta Trabucato. Between this point, 600 yards southward of which lies a rock with a depth of 5 feet over it, and the narrow neck of land to the westward, the distance is 3 miles, and halfway, is Secche della Reale, a cluster of rocks above water, with a spit of 11 and 13 feet, $\frac{1}{2}$ mile northwest and southeast of it. There is anchorage on either side in convenient depths over muddy bottom.

Light.—On the northwestern end of Secche della Reale, from a masonry tower, is exhibited, at an elevation of 45 feet above the sea, an unwatched flashing white light. It is visible 12 miles. (See Light List.)

Lightbuoy.—At the southeastern end of Secche della Reale a lightbuoy is moored in 10 fathoms of water. It exhibits a flashing red light.

Communication.—Steamers running between Cagliari and Porto Torres call at Cala d' Oliva, and there is telegraphic communication.

Rada dei Fornelli, on the southern side of Asinara, is between Punta Barbarossa and Isola Piana. There is anchorage, with good holding ground, in about 10 fathoms of water, in the middle of the bay and 1,200 yards from the land.

Golfo dell' Asinara.—The deep indentation on the north coast of Sardinia, between Asinara and Capo Testa, may be comprised under this name. It is 39 miles across the entrance and about 20 miles deep. The shores present no very marked feature. In the western bight, between Punta Falcone and Porto Torres, they are

low and sandy, also near the Fiumi Sorso and Coghinas; along the remainder a rocky coast bounds a range of hills of considerable elevation.

With the exception of Secca di Castel Sardo and the rocks off Castel Sardo, all dangers lie within $\frac{1}{2}$ mile of the shore; the depths are from 20 to 40 fathoms at 3 miles off, but farther out toward the entrance the bottom is very uneven, depths of from 90 to 300 fathoms being found but a short distance apart; the bottom is fine sand and shells, with some clay.

From Punta Nera, 2 miles southeastward of Punta Falcone, a rocky shore trends to the southward for nearly 3 miles to Torre delle Saline, near which are a tunny factory and good boat harbor; thence past several salt lakes, $3\frac{1}{2}$ miles south-southeastward, is the outlet from the large lake of Pilo, and 6 miles farther eastward is Porto Torres.

Tunny fishery.—Tunny nets are laid out, during the season, March to November, for a distance of 2.2 miles in a northeasterly direction from Torre delle Saline. The outer end of the nets are marked by day with two buoys. (See Caution, p. 61.)

Porto Torres is formed by two inner moles, and an outer mole extending from the inner end of the Inner East Mole in a northeast direction for about 400 yards, and then curving in a northwest direction for a distance of 550 yards, the greater part of the outer space having depths of from 4 to $5\frac{1}{2}$ fathoms, and most of the inner port (Porto Vecchio) from 18 to 21 feet. Dredging operations were in progress inside the Outer Mole, but in 1912 were suspended.

Caution.—On account of the deposits washed down by the Torrente Turritano, the depths in the outer harbor are now less than those shown on the chart.

Harbor works.—The construction of quays within the port was commenced in 1915.

A new West Mole is under construction. Starting from a point on the shore about 306 yards westward from the root of the old West mole, it extends northward about 437 yards and thence northeastward about 371 yards. Its extremity, when completed, will be about 218 yards westward from the extremity of the new East Mole.

Lights—Outer Mole.—A small cylindrical iron building, 23 feet in height, and situated on the extremity of the Outer Mole, exhibits, at an elevation of 33 feet above the sea, an occulating red light, visible 5 miles.

The mast and hut from which the light is shown, are painted in white and red horizontal bands.

East Mole.—An old octagonal tower, 49 feet in height, situated near the harbor office at the root of the Inner East Mole, exhibits at

an elevation of 65 feet above the sea, a group flashing white light, which is visible 13 miles.

A flashing red light is shown from a post painted in white and red horizontal bands 16 feet high at the mole head; it is elevated 20 feet above the sea, and is visible 2 miles.

West Mole.—A flashing green light is shown, at an elevation of 16 feet above the sea, from an iron mast, painted in white and black horizontal bands, 11 feet in height, at the extremity of the West Mole; it is visible 2 miles. (See Light List.)

Wreck.—The wreck of the steamer *Costazzurra* lies sunk in Port Torres, about 328 yards 165° from the oculating red light on the end of the Outer Mole.

Buoys.—A mooring buoy lies in Porto Vecchio, about 267 yards westward from the lighthouse at the root of East Mole.

Pilots may be obtained.

Pilots should, when requested, conduct vessels leaving up to $\frac{1}{2}$ mile beyond the entrance to the port, always provided the state of the weather permits.

Anchorage.—Tolerably good anchorage may be obtained in 10 fathoms water about 400 yards northeastward of the head of the Outer Mole. With winds from northwest to northeast vessels should seek shelter in one of the anchorages of Isola Asinara.

Town.—Torres is of ancient date, as testified by the Roman ruins surrounding it, and is, with Alghero, the port of trade for Sassari and its district. It is defended by a large square tower, and the town is one long street in which is the old cathedral of San Gavino; the population is 4,225. The climate is said to be unhealthful.

Torrente Turritano enters the sea a little westward of the port, and is crossed near the mouth by a substantial Roman bridge of seven irregular arches. The country around Torres is bare, scattered with a few plani trees and brushwood.

Communication.—Weekly steamers to Genoa, Leghorn, Spezzia, Bastia, and to Ajaccio in Corsica; fortnightly to Maddalena, Castel Sardo, Santa Teresa, and Bona. The railroad from Torres joins the main line between Cagliari and Terranova at Chilivani junction; there is telegraphic communication at limited hours, and a good macadamized road of 11 miles leads to Sassari, and thence to Cagliari, a distance of 146 miles.

Coal and supplies.—About 750 tons of coal are kept in stock, and 200 tons could be put on board in 24 hours, weather permitting; there are 6 lighters.

Fresh provisions may be obtained, and the water is of good quality.

Trade.—The exports from the district are chiefly oil and wine.

Sassari, the second city in the island and capital of the Province, situated upon rising ground of 722 feet above the sea, 10 miles from

Porto Torres, is inclosed by walls with towers, and has a citadel, now used as a barracks; it contains a cathedral, numerous churches, several convents, a university, official establishments, and a famous marble fountain adjacent. The population is about 42,240.

Coast.—From Punta di San Gavino a Mare (a little eastward of Porto Torres) to Punta Pedras de Fogu, distant 10 miles, is a low coast, chiefly of sand; midway on a hill, 430 feet above the sea, is the town of Sorso, the church with cupola and steeple being conspicuous. Punta Pedras de Fogu and the coast eastward of it is rocky, and slopes up to the Edera Plain, which is 1,959 feet above the sea; off the shore are many scattered rocks extending for a distance of $\frac{1}{2}$ mile, but the 5-fathom curve will be found a little beyond that distance.

Castel Sardo, a small fortified town about $4\frac{1}{2}$ miles east-north-eastward of Punta Pedras de Fogu, occupies an elevated position immediately over the sea, and was, under the Spaniards—its former possessors—named Castel Arragonese; it has been a place of considerable note, but now contains a population of only 2,341.

There is a citadel on a crag, 374 feet above the sea, to the south-westward of the town, and on both sides of the crag (which are of volcanic origin and from 200 to 300 feet in height) are small coves, adapted for a few coasting vessels, but they are much exposed; that to the westward has a sandy beach, and is partly sheltered by a small islet, on which are some ruins. Close off the castle point is another islet, beyond which there is deep water.

Anchorage may be obtained northeastward of the castle, in from 14 to 16 fathoms water.

Rocks.—Situated within 1 mile in a northwesterly direction from the Campanile of Castel Sardo are two rocky patches with 7 and 9 fathoms water over them, the outer, named Secca di Frigiano, with the latter depth, northwestward from the point; the water is deep around them, and with northerly winds there are heavy overfalls. Secca di Punta Spinosa, about 1 mile westward of Castel Sardo, has a depth of 5 fathoms over it.

Communication.—A steamer every week to Porto Torres, Leghorn, and Genoa, and telegraphic communication.

Secca di Castel Sardo, at a distance of 5 miles 9° from Castel Sardo, a more dangerous shoal having 6 fathoms over it, extends about $\frac{1}{2}$ mile in the same direction, beyond which there are 20 and 30 fathoms, and about the same depth between it and the shore. This shoal was formerly supposed to have only 4 fathoms water, but 6 fathoms was the least water found during the Italian survey, 1879.

Coast.—From Castel Sardo the coast, partly rocky, but chiefly of sand, extends in an east-northeasterly direction to Capo Monte di Fava, $10\frac{1}{2}$ miles distant, and has generally a depth of 5 fathoms

within $\frac{1}{2}$ mile of the sandy beach, except about 3 miles eastward of Castel Sardo, where that depth is nearly 1 mile from the shore. Nearly midway between the capes is a narrow lake into which flows the Fiume Coghinias, the second largest river in the island; on the eastern side the country is well wooded, and on the western richly cultivated. Rising above the plain, 5 miles to the southeastward, is Castel Doria, a square tower on an isolated mountain, 791 feet above the sea, westward of the river.

Capo Monte di Fava, a low rocky projection, is separated from the western point, 88 feet above the sea, off which is the bare islet of Rossa, by Cala Falsa, a small cove with about 8 fathoms water in it; a few rocks fringe the shores, and there are depths of 20 fathoms $\frac{1}{4}$ mile from the point, on which stands Torre Monfronara, 75 feet above the sea.

From Capo Monte di Fava a bleak iron-bound coast trends in a northeast direction, for a distance of 10 miles, toward Punta Vignola, backed by the slopes from the mountainous range of Monte della Spina, 2,625 feet, and Monte Giuncana, 1,795 feet above the sea, down which flow a few small streams. Detached rocks lie at a short distance off the shore, the farthest distant being Secca di Moli, which is 6 miles from the cape and about 800 yards offshore.

Punta Vignola, on which there is a round tower, 62 feet above the sea, lies 3 miles beyond Secca di Moli, and a short distance southeastward of it are the village and boat port of the same name, to which the coral fishermen repair for shelter and water and find tolerable security near the round tower. The country eastward of this to Santa Reparata is a barren waste; within the point there is a valley (watered by a river from the mountains) covered with the wild olive and the vine, and abounding in tortoises; westward as far as Capo Monte di Fava it is a wooded uncultivated tract.

Capo Monte Rossi.—Between Punta Vignola and Capo Testa, $7\frac{1}{2}$ miles distant, the coast forms a spacious bay about 4 miles in depth to Cala Vall'Alta. A bold headland of red granite, 292 feet above the sea, lies 3 miles eastward from Punta Vignola; it is named Capo Monte Rossi, and close off it is a small islet. On both sides of the cape is a sandy plain, readily distinguished from the offing; that on the east named Arena Grossa, and the other Arena Maggiore. Off this latter beach, nearly $\frac{1}{2}$ mile from the mouth of a stream, is the islet of Connetta, round which and off the shore are some rocks under water.

Cala Vall'Alta is about $2\frac{1}{2}$ miles eastward from Capo Monte Rossi and 4 miles southward of Capo Testa. Northward of Cala Vall'Alta is a broken rocky coast as far as the sandy neck, which connects Capo Testa with the land about Porto Longosardo. A few islets and rocks lie off the shore; the south of the isthmus is a considerable

reef, which fringes the shore to a distance of 400 yards; the bight southward of the isthmus is named La Corba, which has depths of from 5 to 10 fathoms, and where shelter will be found with north-easterly winds.

Water.—At La Corba fresh water may be procured from a source near the sea.

Bonifacio Strait, between the northern end of Sardinia and the southern end of Corsica, is $6\frac{1}{2}$ miles wide; several islands with passages between them lie off the coasts of either island, narrowing the main channel, or strait, to 3 miles in breadth. The passages between the islands of Porraja, Ratino, and Cavallo, which are convenient for steamers or vessels with a fair wind, are described in Chapter IV, and the passages between the intermediate islands and the coast of Sardinia have already been described.

Bocca Grande or main channel, or properly called Stretto di Bonifacio, lies between Isola di Razzoli (Sardinia) and Isola di Lavezzi (Corsica), which islands lie in a northwest and southeast direction, distant $3\frac{1}{2}$ miles from each other.

Secca di Lavezzi, lying 1 mile 194° from the lighthouse on Isola Lavezzi, is a dangerous rocky shoal, with 8 feet of water over it; it is steep-to on the southern side, but on the northern is foul.

Beacon.—A circular stone safety beacon, about 30 feet in height, with red and black horizontal bands and surmounted by a refuge, marks Secca di Lavezzi.

A ledge of rocks, about 10 yards in extent, with $3\frac{1}{2}$ fathoms least water, and 9 to 10 fathoms close-to, is situated 700 yards 40° , from the beacon.

Light.—From the beacon on Secca di Lavezzi, at an elevation of 54 feet above high water, an unwatched group occulting white light is exhibited from a lantern with a white cupola. It is visible 7 miles. (See Light List.)

Detached shoals.—A bank, with less than 10 fathoms water, extends nearly $\frac{1}{2}$ mile southward of the beacon; on its extremity is a patch with 28 feet water over it situated 900 yards 162° from the beacon, and with other patches of 4 and 5 fathoms between.

An isolated rock, with $4\frac{1}{2}$ fathoms water over it, lies with the beacon bearing 220° , distant 650 yards; between this rock and the 28-foot patch are two other heads with $4\frac{1}{2}$ and $4\frac{1}{2}$ fathoms over them. The red sector of Punta Becchi (Isola Lavezzi) light and the red sector of Isola Razzoli light shows over Secca di Lavezzi and its detached shoals.

Clearing marks.—The Croix de la Trinité (on a conical hill northwestward of Bonifacio) kept open of Capo Pertusato 319° leads southwestward of Secca di Lavezzi and detached shoals; and

the eastern side of Isola Lavezzi in range with the highest part of Cavallo, bearing 358° , leads eastward of them. At night Razzoli occulting white light bearing 86° will lead a long $\frac{1}{2}$ mile southward of the rock and shoals, or keep southward of the southern limit of the red sector, which is thrown over the rock from that light. A red sector of light is also (as before mentioned) thrown over the rock and shoals from Isola Lavezzi Light; the navigator may therefore be sure that he is not near this danger when one of the lights is seen white, but should both red lights be seen the course must be altered immediately.

Directions from west to east.—Vessels from the westward bound to Civita Vecchia, Naples, or neighboring ports generally take the Bonifacio Strait. Approaching the entrance to the strait a course should be steered a little to the northward, allowing for the effect of the currents. If the wind is from the northern quarter sailing vessels make the land at Capo Pertusato (the southern extremity of Corsica), known by its whiteness and by the light tower on it; with the wind from the southern quarter, the island of Asinara, off the northwestern point of Sardinia, recognized by its elevation and the lighthouse on its summit.

By day, on arriving off the entrance, the islets appear to form a barrier without any opening, but on a nearer approach the wide passage between the islands of Lavezzi and Razzoli will be seen, together with the stone beacon on Secca di Lavezzi. Capo Testa, on the southern side, is also a conspicuous headland, being conical and isolated, with a signal tower on the summit and lighthouse below nearer the point.

If near Capo Testa and the fog should prevent Isola Razzoli being seen, by bringing this cape to bear about 180° 1 mile, and steering thence 82° , will lead about the same distance southward of Lavezzi detached shoals. On arriving off the entrance, should the wind be ahead, a sailing vessel can work to windward between the islands of Razzoli, Budelli, and Spargi, which are without dangers; the beacon sufficiently marks Secca di Lavezzi, which can be approached at a prudent distance on all sides, the northern being the shoalest. Vessels of deep draft should avoid Lavezzi detached shoals and the others already mentioned.

Steamers going southward generally pass through Estuario della Maddalena (see Caution and Passage prohibited, p. 401), which, although winding and in some places narrow, offers a clear, deep channel with good anchorages throughout.

In taking this passage, the western entrance to which is between Isola Spargi and Punta Sardegna, steer to pass southward of the island to avoid Secca Corsara, with $1\frac{1}{2}$ fathoms water over it; the

southwest point of Santo Stefano in range with Punta Sardegna, bearing 123° , leads northward of Scogli Paganetto off Punta Rosso, on which there is a beacon, and leads to the southward of Secca Corsara.

The coast of Sardinia should be kept on board to avoid the rocks between Maddalena and Santo Stefano (marked by beacons); passing through the channel between these and Sardinia, and after rounding Capo Orso keep a little to the southward of Caprera, or with that cape just open of the southwest point of Santo Stefano bearing 300° , and thence either northward or southward of Isola Biscie.

Caution.—The buoys and beacons are not always to be depended upon.

At night.—Approaching the strait by night, give the western side of Capo Testa a berth of 2 miles, so as to ensure passing outside the dangers which lie on the west and southwest sides of the peninsula. When Capo Testa light bears 180° , distant about 1 mile, steer for Isola Razzoli light (occulting white) bearing about 72° until the fixed red sector of light from Isola Lavezzi changes to fixed white, bearing 334° , when a 37° course should lead through Bocca Grande.

If from the northwestward, bring Razzoli occulting white light to bear 86° before Capo Pertusato group flashing light bears 328° , and steer on Razzoli light, bearing 86° , and having passed the red sector of Isola Lavezzi light, steer 37° as above. A sailing vessel working through the strait during the night should not stand to the northward beyond the southern limit of the red light from Razzoli, bearing about 93° .

It must be remembered that the currents often follow the direction of the prevailing wind, and that their velocity is in proportion to its force. Also that in a gale, particularly from the northwest, the sea breaks everywhere in the passages, and the currents then being very rapid much attention to the helm is necessary. In summer it often happens that while the wind is northwest at the western entrance, it is east in the eastern portion of the strait.

From east to west.—On approaching the entrance to the strait from the eastward the islands of Corsica and Sardinia appear united by a chain of islets and rocks; but if sufficiently to the northward to have Isola Lavezzi bearing less than 280° , a clear passage will be seen.

Approaching from the southward pass to the northward of Isola Santa Maria and Isola Razzoli; but in a sailing vessel, should the wind be northerly and scant for passing to windward of these islands, the passages between the islets lying between Santa Maria and Maddalena may be used, thence to the southward of Budelli, and for the middle of the channel between Lavezzi and the coast of Sardinia.

At night.—Isola Razzoli Light is obscured by the land southward of the bearing of 291° , and until it is sighted a vessel should be careful not to enter the arc of red light from Capo Ferro, between the bearings of 172° and 206° ; crossing this arc with Razzoli Light just sighted will pass $1\frac{1}{2}$ miles northward of Secca dei Monaci, and 2 miles northward of Isolotti Monaci.

From the northward, the channel between Isola Cavallo and Isola Perduto can be taken, or that eastward of Scoglio Perduto; in the first case take the middle of the channel, steering 202° , and either round Isola Lavezzi at the distance of 800 yards, or go to the southward of Secca di Lavezzi, and out to the westward as before.

In passing outside Scoglio Perduto (which lie 1,400 yards to the southeastward of the islet), keep Razzoli Lighthouse bearing westward of 170° until 1 mile southward of Perduto, when a course of 226° will lead well to the eastward of Secca di Lavezzi. To pass southward of Secca di Lavezzi, keep Croix de la Trinité open westward of Capo Pertusato bearing 319° . There is no difficulty in working through, so long as the beacon remains or these marks are attended to.

It is by no means a rare occurrence to find the wind from the northwest on arriving at the western entrance of the strait, when previously it had been even fresh from the southeast; and should it be too fresh for a sailing vessel to work to windward anchorage can be obtained in Rada di Mezzo Schifo (Agincourt Road).

Should there be signs of bad weather from the westward it might be preferable to run along under the coast of Corsica with the southeast wind, which is often very fresh, and double Capo Corso at a good distance. If bound to the northern ports of France the passage might thus be made more quickly than by remaining at anchor until the wind admitted of clearing the strait.

At night.—As soon as Razzoli Light is made, keep it bearing between 180° and 235° ; the first bearing passes well to the eastward of Scoglio Perduto, and the latter to the northward of Isola Santa Maria; pass about 1 mile northward of Razzoli Light, and when it bears 180° alter course to 242° for Capo Testa Light; this course leads 1 mile southward of Secca Lavezzi and shoals; and when the light on Capo Pertusato bears 328° alter course as requisite.

With a steady favorable wind, there is no difficulty for a sailing vessel in this passage as long as the lights are seen; otherwise it would not be prudent to enter it, but rather to anchor in one of the roads on the northeast of Sardinia.

Currents in Bonifacio Strait.—It has been stated previously that the currents run in the direction of the prevailing wind, and that their velocity is in proportion to the force of the wind.

Mr. A. C. Southwell, Lloyd's agent for Corsica, states the following as the results of his observations made in the months of April, May, and June, 1887, between Porto di Bonifacio and Scogli Monachi (Les Moines), which are 12 miles to the westward of the port, and from information obtained on the spot:

The currents frequently precede the wind by a considerable amount of time, running eastward before the setting in of a westerly wind, and vice versa, and often with much force. The navigator must not, therefore, conclude that because the weather is calm there will be no current.

In Porto di Bonifacio, Mr. Southwell observed, at irregular intervals, a rise and fall of water, often amounting to 2 and 3 feet, and on some occasions as much as 4 feet. And he was informed that during the winter the rise is even greater, the water completely covering the quays. There is no appreciable lunar tide at any time.

Local authorities at Porto di Bonifacio state that the rise and fall of the water is a foretelling of the weather that may be expected; that a rise indicates an easterly current running in the strait before westerly winds, which will follow in a few (seldom less than four or five) hours; that the fall of water during fine weather will indicate in like manner a westerly current running before easterly winds; and that the amount of the rise and fall will indicate the force of the expected wind.

It is also observed that the water commencing to fall while a strong westerly wind is blowing is an indication that within a few hours the wind will subside, and if the fall continues easterly winds follow.

Mr. Southwell remarks that his own observations taken at Scogli Monachi, as well as at Porto di Bonifacio, were in confirmation of the above-mentioned rules.

Fogs are said to occur frequently in the early morning in the month of May in Bonifacio Strait.

CHAPTER VII.

THE SICILY AND MALTA CHANNELS, THE MALTESE ISLANDS, THE ÆGADEAN ISLES, AND THE WEST AND SOUTH COASTS OF SICILY.

Skerki Bank.—An extensive bank, composed of rock, sand, coral, and shells, lies in the fairway channel between the coasts of Tunis and Sicily, and extends, with less than 100 fathoms water on it, about 36 miles in a northeasterly and southwesterly direction.

Keith Reef, in approximately latitude $37^{\circ} 50' N.$, longitude $10^{\circ} 57' E.$, the shoalest spot on Skerki Bank, is of compact limestone, nearly $\frac{1}{2}$ mile in length and 700 yards in breadth, with a space of about 6 feet square covered with weeds, nearly awash, which generally breaks. On the northern side of the crown of the reef there is 2 fathoms water, 8 fathoms on the eastern, and 14 fathoms on the western side. All round the reef, at the distance of 400 yards, there are depths of 17 fathoms, deepening suddenly to 40 fathoms.

Biddlecombe Patch, 2 miles to the northward of Keith Reef, is about 200 yards in extent, with $4\frac{1}{2}$ fathoms water on it, and from 23 to 45 fathoms between. About 1 mile southeastward of Keith Reef, and the same distance northwestward of Biddlecombe Patch, there is a depth of 100 fathoms. In approaching, the water is clear and the bottom distinctly seen at a considerable depth. In calm weather the sea does not break, and then the reef is not visible.

Hecate Patch, with a depth of 4 fathoms, lies $6\frac{1}{2}$ miles southwestward of Keith Reef. Locust Patch, with 9 fathoms least water, lies $\frac{3}{4}$ miles northwestward of Hecate Patch. Within an area of 1 mile from Hecate Patch there are from 9 to 50 fathoms; to the southward the water deepens rapidly.

Sylvia Knoll.—During the examination of Skerki Bank made by the British surveying vessel *Sylvia* in the year 1885, a knoll was found near the northeast extremity of the bank. This, named Sylvia Knoll, has a depth of 7 fathoms, with 25 to 28 fathoms close-to, and lies 7 miles northeastward of Keith Reef.

Caution.—As the currents are uncertain both in strength and direction, and the reefs not always seen, mariners should take great care to give all these dangers a wide berth.

Pantellaria (ancient Cossyra).—The northern point of this island lies 46 miles 109° from Cap Bon, and 56 miles 219° from Capo Granitola, in Sicily. The island belonging to Italy, and administratively in the Province of Trapani, is about 7 miles in length in a northwesterly and southeasterly direction nearly $4\frac{1}{2}$ miles in breadth and composed of a mass of volcanic rock, with vestiges of craters, large quantities of lava, scoriæ, and pumice stone.

The hills are covered with brushwood and the valleys are cultivated with olives, figs, vines, and vegetables. The land is high and broken, rising near the center to a conspicuous peak 2,730 feet above the sea, and sloping to each end, the east being much the higher. On the southern side of the highest mountain is a wood of fine trees, chiefly of chestnut and oak, and lower down are numerous olive trees.

On the summit of the mountain is a great natural curiosity, the remains of a crater about 90 feet deep converted into a deep lake, which is surrounded by a wall. The ridge of high land around the crater forms a complete amphitheater and commands a delightful view of the lake, the surrounding land, and sea.

Light.—On Punta Spadillo, northeast coast of Pantellaria, a white circular tower 69 feet in height, and surmounting a two-storied dwelling, exhibits at an elevation of 164 feet above the sea a flashing white light visible from a distance of 19 miles. (For arc of visibility, see Light List.)

Il Porto, at the norwestern end of the island, between Punta San Leonardo, which is low, and Punta della Croce, is a bay about $\frac{1}{4}$ mile wide and nearly the same deep, open to the northwestward; the greater part is shallow and encumbered with rocks, several of which are above water and extend to the northeastward for a distance of 400 yards from the western side of the bay. Between the rocks and a cove on the eastern side of the bay is a clear space about 200 yards in extent, with 3 fathoms water.

A mole extends about 300 yards from the western side of the bay, and between its extremity and rocks extending 150 yards from the eastern side is the entrance, nearly 100 yards in width, to another cove, nearly circular, less than 200 yards in diameter, with from $1\frac{1}{2}$ to 2 fathoms water, where the country vessels are secured.

Lights.—On Punta San Leonardo, from a red iron structure, above a hut with a white roof, 33 feet in height, is exhibited at an elevation of 43 feet above the sea an occulting white light. The light is visible 10 miles.

At the head of Il Porto a fixed red light is shown from a bracket on a wall 16 feet in height, at an elevation of 16 feet above the level of the sea, visible 2 miles.

A fixed green light of small power is shown from the church of San Nicolo del Borgo and is situated 250 yards southwestward of the

preceding light. Too much reliance must not be placed on the two harbor lights.

Submarine telegraph cable—Beacons.—A cable connects Pantellaria with Mazzara (south coast of Sicily). Its direction is marked by two beacons.

The beacons are posts, each surmounted by a white framework globe, one of the globes having the letter T on it, painted black. The rear beacon is attached to San Leonardo Lighthouse; the front beacon is situated on a rock near the water. There is also a board, where the cable is landed, with notice that anchorage, etc., is prohibited near the cable.

Anchorage.—Large vessels will find temporary anchorage outside the bay in about 18 fathoms water, over sandy bottom, with the castle bearing 139° $\frac{1}{4}$ mile; smaller vessels may anchor westward of Punta San Leonardo in $4\frac{1}{2}$ fathoms water, with good holding ground of sand, avoiding the telegraph cable.

Town.—The town of Pantellaria occupies the head of the bay, and in the middle of it is a conspicuous castle and prison. The population of the island is about 8,700.

The ruins of the ancient city of Cossyra are on the slope and in the valley southeastward of the town, and there are some natural mineral baths of great antiquity.

Communication.—Weekly steamers alternately to Trapani and Porto Empedocle, and frequent communication with Tunis, but the vessels do not communicate in bad weather. Telegraphic communication: The telegraph office is open till 9 p. m.

Supplies.—Moderate supplies of fresh provisions and water may be obtained.

Lloyd's signal station.—A Lloyd's signal station and semaphore is established at Monte Sant' Elmo, southeastward of the town.

Trade.—Vines are grown extensively, and the production of wine and dried currants is not unimportant; there is also a small export trade of oil, cotton, and orchitt for dyeing, and the island is famous for a hardy race of donkey, supposed to be of African origin, but developed into a species.

Pratique.—Vessels on arriving have to obtain pratique; the health office is on the northern side of the harbor; the town landing place is at a small pier, westward of the castle.

Coasts.—The northeast coast of the island is irregular and rocky, and between Kharuscia Point and Punta Spadillo is a bay, about $1\frac{1}{2}$ miles in width, in which is Khartibugal Shoal, of $5\frac{1}{2}$ fathoms, situated $\frac{1}{2}$ mile offshore, and surrounded by deep water. Within the head of the bay is a lake about 1 mile in circumference, and near it are various warm springs.

About 2 miles southeastward of Punta Spadillo are Cala di Tramontana and Cala di Levante, separated by Punta Tracino, off which is a high, rocky islet with deep water between. From Cala di Levante the coast to the southward and southwestward (for $4\frac{1}{2}$ miles to the southern extremity of the island, near Punta Limarsi) is composed of nearly inaccessible cliffs, at the foot of which are some rocks above and below water.

On the southwestern side of the island, a little southward of Punta del Rosso di Nica, and $\frac{1}{2}$ mile off a fall of black lava, is Secca di Nica, on which the depth is 4 fathoms, and a small inlet, named Porto di Scauri, open to the southeastward, is situated inside Punta Tre Pietre, $1\frac{1}{2}$ miles farther northwestward, from which a broken and rocky coast continues to Cala Brabant, $2\frac{1}{2}$ miles northwestward, and then turns to the northward to Punta della Croce, the western point of Rada di Pantellaria.

All this part of the coast is rugged, with steep, inaccessible cliffs, having basaltic caves at the base, and some rocks are scattered along shore, but none at a considerable distance.

Depths offshore.—The 100-fathom curve generally surrounds Pantellaria at distances of from $\frac{3}{4}$ to 1 mile, except on the northeastern side, where, at Punta Spadillo, it is only about $\frac{1}{4}$ mile offshore, and at the northwestern end, where its distance is $2\frac{1}{2}$ miles.

There are races off the several headlands, and the current is said at times to run strong from the westward toward the island. It lies directly in the track of vessels proceeding to Malta from Cap Bon; therefore at night or in thick weather a good lookout is necessary.

Scourge Patches and Pantellaria Patch lie between the bearings of 18° and 31° , distant from 22 to 25 miles from Punta San Leonardo, Pantellaria; Pantellaria Patch, the eastern, has a depth of 5 fathoms near its western extremity.

About $3\frac{1}{2}$ miles westward of it the larger patch extends about 2 miles east and west and $1\frac{1}{2}$ miles north and south, and has from 7 to 14 fathoms water over it.

With the exception of Smyth Patch, of 20 fathoms, about 7 miles westward of the preceding, the surrounding depths to that distance are from 40 to 45 fathoms over sand, shells, and gravel.

Vessels of deep draft should avoid these patches, especially with any sea, by keeping within the distance of 20 miles from Pantellaria, while the peak of that island bears between 188° and 203° .

Talbot Shoal (in approximately lat. $37^\circ 28' N.$, long. $11^\circ 39' E.$), about 30 miles to the northwestward of Scourge Patches, is about $\frac{3}{4}$ mile in diameter. A little to the westward there is a depth of 200 fathoms; but to the eastward, adjacent to Adventure Bank, uneven ground of from 13 to 50 fathoms. The shallowest part, 8 fathoms, bears 338° , distant 46 miles from the peak of Pantellaria.

Graham Shoal, which is the remains of the volcanic island of the same name, had in 1863 the least water on it of 15 feet, from which San Calogero Monastery, northeastward of the town of Sciacca in Sicily, bears 42° , distant 28 miles. Capo Granitola Lighthouse lies 25 miles to the northward, but the range of the light will not allow it to be seen from any part of this shoal.

In an examination made by the officers of the British surveying vessel *Shearwater* in the year 1870, a depth of 3 fathoms was found in this position. In the year 1885 not less than 4 fathoms could be found by the British surveying vessel *Sylvia*. The minimum depth, $2\frac{1}{2}$ fathoms, has, however, been retained upon the charts.

The shoal has two heads close together, and at the distance of about 20 yards all round there are from 7 to 9 fathoms water. The bottom is cinders and fine black sand, occasionally coral and brown sand. At about $\frac{1}{2}$ mile from the least water is a patch with 19 and 20 fathoms on it.

The shoal lies on the western edge of a bank which extends about 12 miles east and west and 9 miles north and south, having on it several patches, the depths varying from 18 to 90 fathoms. At 2 miles westward of the shoal there are depths of more than 150 fathoms.

Respecting this interesting phenomenon, Commander Swinburne, of British naval sloop *Rapid*, states that on June 28, 1831, when passing nearly over the spot, several shocks of an earthquake were felt, proving that volcanic action was in operation. On July 19, after an eruption of a high column of water and smoke, a tract of land with a crater mouth rose a few feet above the level of the sea, and was in great activity, emitting vast volumes of steam, ashes, and scorice. From that time it gradually increased in dimensions, magnificent eruptions of cinders with white vapors rising to the height of from 400 to 1,000 feet, accompanied by a noise like thunder; at night constant shootings of small columns of fire were visible, with occasional flashes of sheet lightning. Toward the end of August its circumference was about 1,080 yards, and its height stated to be from 107 to 180 feet; then various changes took place, it gradually subsided, and in December had disappeared; in January, 1832, there were from $2\frac{1}{2}$ to 3 feet of water over the spot.

Current.—The current in the vicinity of the shoal is irregular both in strength and direction, generally, however, setting to the southeastward, and at times as much as 3 knots an hour to the northeastward.

Terrible Bank is the name given to the eastern part of the before-mentioned bank; its shoalest spot of 18 fathoms lies 7 miles eastward of the Graham Shoal.

The Maltese Islands.—Gozo (ancient Ganlus), named Ghau-desh by the natives, the second in importance of the Maltese Islands, is 8 miles in length, in a west-northwestward and east-southeastward direction, and 4 miles in breadth, containing an area of 20 square miles, and a coast line of 25 miles. It is separated from Malta by a channel $2\frac{1}{2}$ miles wide, in the middle of which is Comino Island.

Gozo is entirely surrounded by perpendicular cliffs, those to the south and west attaining a great elevation. The principal town is Rabat, near the center of the island, and there are also several villages and scattered houses; the whole island is well cultivated. The small bay of Mjiar on the southeast coast is defended by Fort Chambray; there are besides several towers and redoubts around the island. There is a coral fishery on the western and southern side of the island.

North coast.—Cape San Dimitri, the northwestern extremity of the island, is high, bold, and steep-to, the 50-fathom contour curve passing within 400 yards of the cliffs. At 2 miles eastward of the cape is Ras Pinu, the intermediate coast being high and steep; and about $\frac{1}{2}$ mile inland Guirdan is a remarkable hill 528 feet above the sea.

Light.—On the highest part of Guirdan Hill, at $\frac{1}{2}$ mile from the coast, is a white tower 71 feet in height surmounting a dwelling; it exhibits, at an elevation of 595 feet above the sea, a revolving white light which is visible 24 miles. (See Light List.)

Signal station.—There is a signal station on Guirdan Hill, the flagstaff being close to the northward of the lighthouse.

Coast.—About 1.3 miles eastward of Ras Pinu, the little promontory named Gholya Baida, faced with low cliffs, juts out from the coast, forming a small bay on each side of it, and has a remarkable steep, white mound 85 feet high and shaped like a truncated cone standing on it; a small redoubt stands eastward of the mound, and midway between the two points shallow water extends off nearly 300 yards; and a rocky shoal with from 2 to 3 fathoms water over it extends northward and eastward of Gholya Baida.

Marsa Forno, $\frac{1}{2}$ mile eastward of Gholya Baida, is an inlet about $\frac{1}{4}$ mile deep and 300 yards wide, with depths of from 3 to 4 fathoms in the middle and a beach at its head; the eastern side of the inlet is fringed by a reef which is awash. The village of Marsa Forno stands at the head of the inlet, and a small church with a spire in the southeastern corner. There is also a small camber for boats, protected by two arms of a breakwater and having 6 feet of water in it.

Close westward of Marsa Forno is Gholya-is Safra, a remarkable, isolated, steep, conical, yellow hill 206 feet above the sea, and $\frac{1}{2}$ mile

southward of this another remarkable hill, named Gholya Merzuch, is 322 feet above the sea.

From Marsa Forno as far eastward as Il Jebba tal Mistra, a distance of $2\frac{1}{2}$ miles, the general appearance of the coast is that of a flat table-land bordered by precipitous reddish cliffs from 250 to 350 feet above the sea, which breaks down in steep slopes of large boulders to the shore.

The line of cliffs is intersected by Wied-il-Ghanak and Wied-la San Mas, the two main cultivated valleys, and the steep slopes at the base of the cliffs and between the large boulders are cultivated with vines. The villages of Shara and Nadur, with their churches and several windmills, are seen on the table and toward the interior of the island.

On the first cliff eastward of Marsa Forno is Torri ta Shara, a square redoubt with a tower 45 feet in height and standing 370 feet above the sea.

Ramla el Kibifa, $1\frac{1}{4}$ miles eastward of Marsa Forno, has a conspicuous sandy beach with a white statue in the center of it; the bay is shallow and rocky, but affords temporary anchorage to small vessels in fine weather, care being taken to avoid patches of rock which show distinctly from the white sand which forms the general bottom of the bay.

A rock, with less than 6 feet water over it, lies about 200 yards from the shore with Torri ta Shara bearing 280° , distant 1,100 yards.

A bank 500 yards in length in an east and west direction and 200 yards in breadth, with from 9 to 10 fathoms water over it, lies eastward distant 1,100 yards from Ir Rajel, the eastern point of Ramla el Kibifa; there are depths of from 11 to 15 fathoms between this bank and the shore.

San Blas Bay, the next bay eastward of Ramla el Kibifa, has two rocky patches, with 2 fathoms least water over them, lying about 300 yards from the nearest point of the shore on the western side of the bay.

Il Jebba tal Mistra, $2\frac{1}{2}$ miles eastward of Marsa Forno, is a bold point formed of large boulders that have fallen from the cliffs above; Torri ta Isopu, a square tower, 44 feet in height, stands near the edge of the cliff immediately above the point. To the eastward of Il Jebba tal Mistra the coast becomes less precipitous to Ras il Kala, 2 miles distant; about 700 yards westward of Ras il Kala are some stone quarries.

Ras il Kala, the eastern extremity of Gozo, is clear of outlying dangers. About 700 yards southwestward of it is a rocky islet, named Jebel tal Halfa, 72 feet high, from which a chain of rocks

extends westward parallel to the shore for about the same distance; thence the coast is clear of danger to Mjiar Bay.

The channel between Gozo and Comino, named *Il Fliegu ta Ghau-desh* (North Channel), is about $\frac{1}{2}$ mile wide.

Anchorage.—Temporary anchorage will be found off Mjiar, about 400 yards from the shore, in 10 fathoms water, over sand, with the church seen up the main street of the town, bearing about 291° , and the outer rock off Chambray in range with the low point beyond 238° ; but it is exposed to the easterly winds which blow through Comino Channel, and westerly and southerly winds. In approaching the bay from the eastward keep in mid-channel between Gozo and Comino.

Landing.—There is landing by boat at Chambray, just inside a small breakwater made of rough stones, where the Gozo steamers load and discharge their cargoes.

Water may be obtained here.

South and west coasts.—Nearly $1\frac{1}{2}$ miles westward of Mjiar Bay is a small islet 33 feet high, named *Tal Fessei*, fronting Mjiarish Shini, an inlet $\frac{1}{4}$ mile deep, with a well and tower at its entrance, and having 12 fathoms water at the mouth to 2 fathoms at its head.

The coast to *Ras el Newhela*, $\frac{3}{4}$ mile beyond the inlet, is bold, with deep water close-to, whence it trends west-northwestward; the steep white cliffs, having various caves or grottoes at their base, rise to about 160 feet above the sea. The 50-fathom curve passes about $\frac{1}{4}$ mile from the coast.

Ras il Baydha, $2\frac{1}{4}$ miles farther on in the same direction, has a tower on it, and is surrounded by rocks which afford some shelter to *Cala tas Sclendi*, an inlet on its northern side, which is about 400 yards deep, with from 2 to $3\frac{1}{2}$ fathoms water. There is a rock with 4 feet over it, and 4 to 6 fathoms around, lying in the middle of the entrance to *Cala tas Sclendi*; it is situated 150 yards northward of the tower on *Ras il Baydha*. *Cape Bombardo*, $1\frac{1}{4}$ miles to the northwestward of *Ras il Baydha*, is a high, bold, perpendicular headland, steep-to, with a tower on it.

From *Cape Bombardo* the west coast of Gozo trends northward for $2\frac{1}{2}$ miles to *Cape San Dimitri*, and though high and bold is of less elevation than the south coast. About 1,300 yards northward of *Cape Bombardo* is a small islet, named *Ta General* or *Fungas Rock*; it fronts the *Cala Dueira*, a circular basin, about 400 yards in diameter, with from 5 to 7 fathoms water in it; on the northern side is a tower.

The shore, for nearly $\frac{1}{2}$ mile northward of *Ta General*, is bordered by shoal water which extends off nearly 400 yards, and is steep-to. Coral fishing is carried on along the coast.

Comino, the third of the Maltese Islands, is about $1\frac{1}{2}$ miles in length in a west-northwest and east-southeast direction, and 1 mile in breadth, with a coast line of $6\frac{1}{2}$ miles, with irregular cliffy shores, skirted here and there by rocks. The island is mostly cultivated, has a farm, chapel, and wells upon it; a tower, named *Torri ta Kemmuna*, stands on the southwestern end. adjacent on its western side is the islet of *Comminotto* with several rocks; these islets are bare and rocky. *Comino* and *Comminotto* are named, respectively, *Kemmuna* and *Kemmnet* by the Maltese.

Coasts.—The eastern side of *Comino* is entirely composed of high cliffs, rising in many places to nearly 140 feet above the sea, with many caves and scattered rocks at their base. *Skol tal Prosha*, the eastern point, has a cliff 184 feet high, and it is foul for the distance of $\frac{1}{4}$ mile from the cliffs.

The southwestern point of *Comino*, named *Irkieka ta Kemmuna*, is low and sharp, and can be rounded at the distance of 200 yards, as there are no off-lying rocks.

On the northern side of *Comino* are several small bays only suitable for boats, and the northeastern point, named *Ras tal Imnieri*, should be rounded with caution, as foul ground lies off it, and it should not be approached within a distance of 400 yards.

Sultan Rock (*Skoli tal Abiat tal Prosha*), in approximately latitude $36^{\circ} 00' N.$, longitude $14^{\circ} 21' E.$, with a depth of $3\frac{1}{2}$ fathoms, and on which the British naval vessel *Sultan* struck and sank in the year 1889, lies with the rocky islet off *Skol tal Prosha* bearing 333° , distant 316 yards. Another rocky patch, on which the depth is 3 fathoms, lies about 150 yards southwestward of *Sultan Rock*, and a rock, with 4 fathoms, midway between this latter rock and *Comino Island*. There is a depth of $5\frac{1}{2}$ and $6\frac{1}{2}$ fathoms between the patches.

Clearing mark.—*Palazz iz Zgheir* in range with the fall of the cliff of *Rdum il Kau*, behind *Ich Chirkeuua*, bearing 227° , leads about 600 yards southeastward of these dangers.

Anchorage.—It is not desirable for vessels to anchor off the southern shore of *Comino*, as the sandy patches are few and too near the rocks, but on the western side there is anchorage in *Il Mats*, a bay between *Irkieka ta Kemmuna* and *Comminotto*. The northwestern point of *Comminotto* is foul, and in rounding it keep the *Palazz tal Marfa* open of *Irkieka ta Kemmuna*, bearing 139° . If anchoring in either of the *Comino Channels*, care should be taken to avoid the telegraph cables.

Comino Channels are formed on either side of the island of *Comino* and have deep water; but submerged ledges, on which the bottom is rocky and uneven, extend from either side. The north channel varies in width from 800 to 1,200 yards, and has in midway depths varying from 11 to 20 fathoms. The southern channel, named

Il Fliegu ta Malta, has an average width of 1 mile, with depths of 12 to 25 fathoms. It is recommended to keep in mid-channel.

Currents.—The currents are irregular in direction, sometimes setting against a strong wind; but their strength is usually less than 1 knot an hour.

Malta (ancient Melita) is about 15 miles in length, in a northwesterly and southeasterly direction and rather more than 7 miles in breadth, with an area of 95 square miles and a coastline of 79 miles, much of which on the western and southern coasts consists of perpendicular cliffs with steep slopes behind, rising near the southwestern coast, to a height of 845 feet above the sea; the remaining coasts are broken into numerous creeks and bays, the most important being the harbors of Valletta.

The island is of an irregular oval shape, tapering to the northward and rising near the western side at Nadur Tower 785 feet above the sea; its outline presents the appearance of an inclined plane, sloping gradually from the Bengemma Hills to the more level land on the northeast and southeast.

The surface of the island is covered with hills of moderate height with steep slopes, which are terraced and cultivated wherever possible; it has neither lake nor river and comparatively few springs, the water supply being derived chiefly from tanks, with which nearly every house is provided.

Malta contains three cities and many villages; the old capital of Medina Notabile, or Citta Vecchia, with its cathedral situated on the rising ground to the west; Valletta, the present capital and port, and Sliema. The civil population of the islands is about 311,473.

Submarine vessels—Caution.—See page 411.

Signal to indicate presence.—Letter S flag, naval code (a blue triangular flag with a yellow fly), will be hoisted at the Castille, Palace Tower, and customhouse to indicate that submarine vessels are under way in the harbor or within 1 mile of the entrance. This signal does not prohibit the entry or departure of merchant vessels, but is intended to serve as a warning of the presence of submarine vessels.

The Castille will hoist the flag when submarine vessels are observed to be under way within the limits named and at the same time will request Palace Tower and customhouse to do likewise.

The signal will be hauled down at the Castille when the submarine vessels are beyond the mile limit or are secured in harbor.

Artillery practice—Regulations.—The following regulations govern the artillery practice from any fort on the islands of Malta and Gozo:

A blue pennant over a red flag will be displayed at the work from which practice is to take place on the afternoon previous to such practice, and at 7

a. m. on the day on which the practice takes place. The same signal will be displayed from the launch leaving the harbor with targets whenever artillery practice is to take place from any of the defense works in the undermentioned areas. A red flag will also be hoisted 15 minutes before the commencement of and kept flying during the continuance of firing from the work from which practice is to be made.

Limits of fire-zone areas:

(a) Between a line drawn 312° from Fort Madalena and a line drawn 16° from Madalena Tower.

(b) Between a line drawn 16° from Madalena Tower and a line drawn 43° from Spinola, northern point of entrance to St. Julians Bay.

(c) Between a line drawn 43° from Spinola and a line drawn 43° from Fort St. Elmo.

(d) Between a line drawn 43° from Fort St. Elmo and a line drawn 42° from a point on the coast situated 1.1 miles 110° from Fort Ricasoli.

(e) Between a line drawn 42° from the above-mentioned point (d) and a line drawn 98° from a point on the coast situated 1,600 yards 324° from the old tower on northern point of entrance to Marsa Scala.

(f) Between a line drawn 98° from the above-mentioned point (e) and a line drawn 135° from Wolsley Battery, which is situated at a distance of 1,100 yards 34° from Dellmara Point Light.

(g) Between a line drawn 135° from Wolsley Battery and a line drawn 178° from a point on the coast situated at a distance of 1,300 yards 245° from Bingham Point.

(h) Between two lines drawn 282° and 238° , respectively, from Bengemma Fort, on the western side of the island.

The danger limit extends to 14,000 yards from the firing point.

Whenever and so long as a red flag is hoisted at any fort on the shore between the lines described above, denoting the danger area, fishing is prohibited and vessels are forbidden to pass through that area unless compelled to do so by stress of weather, in which case the master of the vessel may be called upon to prove that entering the area was unavoidable.

Any person infringing the above regulations will be liable to be proceeded against, and will be subject to a fine not exceeding \$25 or to a period of detention not exceeding one month, or both punishments simultaneously, and the vessel may be towed out of the prohibited area by Government launches stationed in the vicinity for the purpose.

Caution.—When artillery practice is being carried out at night, vessels approaching the harbors of Malta should keep a lookout for a special signal to be displayed from the naval signal station on the Castille, Valetta, namely, two green lights hoisted vertically at the masthead, indicating "If you wish to enter harbor, enter as soon as possible."

Searchlights.—Searchlights are worked every Tuesday, and possibly on other nights also, throughout the year, in the harbors of Malta.

Any vessel approaching the harbors of Malta when searchlights are being worked, and finding that they interfere with her safe navi-

gation, may make use of the following signals, either singly or combined:

(a) By flashing lamp, four short flashes followed by one long flash.

(b) By whistle, siren, or foghorn, four short blasts followed by one long blast.

Whenever possible, both flashing lamp signals and sound signals should be used.

On these signals being made, the searchlights will be worked so as to cause the least inconvenience, being either doused, raised, or their direction altered.

The signals should not be used without real necessity, as unless the vessel is actually in the rays of the searchlight it is impossible to know which searchlight is affected.

NOTE.—These signals are designed to assist mariners, and do not render the Government liable in any way.

North coast.—From Ponta tal Marfa, the northwestern extremity of the island, the coast, which is low and rocky, trends to the eastward for a distance of 2 miles to Ponto tal Ahrash; and is broken up into several small bays, with beaches; the remains of old batteries stand at the heads of, and on the points between, the bays.

Close to Ponta tal Marfa stands an isolated building, named Palazz iz Zgheir, which is an old resthouse, and farther to the eastward a larger building, of a pink color, with a castellated appearance, is situated just above the coast; it is named Palazz tal Marfa, and is now used as a police station. On the high ridge is another pink castle, named Torri l'Ahmar, which is very conspicuous.

Anchorage may be obtained off this shore, with good shelter from southerly winds; the water is very clear, and the bottom, composed of sand and weed, easily visible in 12 fathoms. In anchoring a sandy spot should be looked for, as there are a few rocky patches; but the chart will be a sufficient guide for their avoidance.

Ponta tal Ahrash is low, and a spit with $4\frac{1}{2}$ fathoms water over it, extends for a considerable distance northwestward from it. Palazz tal Marfa, in line with the fall of the high cliff at Ras il Kammieh, bearing 229° , leads to the northward of this spit in 10 fathoms of water. There is a conspicuous building, 17 feet in height, near Ponta tal Ahrash, named Torri l'Abiat.

Coast.—From Ponta tal Ahrash the coast turns to the southeastward for $\frac{3}{4}$ mile to Dahlet ish Shillip, a high bluff, which forms the northern point of the fine bay of Mellieha; the point is marked by a conspicuous chapel and a statue close to the edge of the cliff. Between Ponta tal Ahrash and Dahlet ish Shillip the coast is composed of high broken cliffs, with rocks below, in places, and especially near the latter point.

Deep water is found within a short distance from the shore, and a good mark for passing along this coast is the western of two wind-mills on the Nadur Ridge of Gozo in range with the perforated cliff on the eastern side of Comino; but frequently the haze, during the summer months, prevents such distant marks from being seen.

Secca il Baida (Balls Bank), a shoal of irregular outline, $1\frac{1}{2}$ miles in length in an east-southeast and west-northwest direction, is situated about 1 mile to the eastward of Ponta tal Ahrash. The general depths over it are from 8 to 10 fathoms, but there are shoal spots of 6 fathoms, and it is not advisable for vessels of heavy draft to cross it. Around are several detached patches, but none are dangerous. Target buoys for artillery practice are sometimes laid out on this bank.

Clearing marks.—Irkieka ta Kemmuna open of Ponta tal Ahrash, bearing 278° , leads to the southward of Secca il Baida, and Ponta tal Marfa, in range with Ponta tal Ahrash, bearing 251° , leads to the northward. Musta Dome, in range with Torri Kaura Beacon bearing 178° , leads to the eastward.

Mellieha Bay is $1\frac{1}{2}$ miles deep, with good anchorage and shelter from northerly and westerly winds for all classes of vessels; the head of the bay is foul, and vessels of deep draft are recommended to keep outside the line on which the rock off Ras il Griebeg is seen under the statue of St. Paul on Gzeier, bearing about 111° . On the southern side, between Ras il Griebeg and Blata il Baida, the coast should not be closed nearer than the 10-fathom curve, as several sunken rocks lie off it surrounded by 7 fathoms water.

The town of Mellieha is built on one of the slopes on the southern side of the bay, near its head, and its church is conspicuous.

Tunny fishery.—Tunny nets extend, during the season, $\frac{1}{2}$ mile in a southerly direction from Dahlet ish Shillip.

Gzeier (the islands), the islet which lies off the Salmun Peninsula, between Mellieha and St. Pauls Bays, has on its western end a large statue of St. Paul the Apostle, which forms a conspicuous and useful landmark. Between Gzeier and the main island there is a narrow rocky channel, only passable for boats, and off the eastern end of Gzeier a spit extends for the distance of 250 yards; Torri il Ghallis (white), open to the northward of Torri Kaura (pink), bearing about 131° , leads to the northward of this spit.

On Selmun Peninsula, which rises immediately behind the town of Mellieha to 500 feet above the sea, stands the Palazz Selmun, once a summer residence of the Grand Masters and still kept in repair.

St. Pauls Bay is well sheltered from all winds except those from northeast to east, the holding ground is good, and, with the exception of a rocky patch near the entrance, vessels can anchor all over it out-

side the 10-fathom curve; within this limit a sandy spot should be looked for. A rocky shoal, with 4 fathoms water over it, lies near the head of the bay about 600 yards northwestward of Skol tal Ghazzonin.

St. Pauls Shoal, with a least depth of $6\frac{1}{2}$ fathoms, rock, lies nearly in the middle of the bay about 800 yards southeastward of St. Paul's statue.

Small vessels will find a good sheltered anchorage between the 5-fathom rocky shoal and Kala Mistra, a little bay on the northern side, with the extremity of Ponta il Mijnuna in range with St. Paul's statue, bearing 22° , and Uardia Tower in range with Nasciar Dome, 137° ; Kala Mistra is foul inside and the head of St. Pauls Bay only suitable for boats.

On the southern side of the bay is the village of San Paul a Mare, a favorite seaside resort during the summer; Uardia Tower, large, square, and white, is conspicuous in the front. Immediately behind the village, the hills slope rapidly from 350 feet above the sea, while to the eastward, along the coast, the ground declines to a low point, named Ras il Kaura, off which a spit extends to the eastward for a distance of 1,000 yards to the 10-fathom curve. Torri San Marcu (pink) under and in range with the left extremity of Fort Madalena, bearing 154° , leads to the eastward of this spit.

Jetty.—On the southern side, and near the head of St. Pauls Bay, there is a small stone jetty 30 yards in length with a depth of 2 fathoms close alongside on either side, but at the head it extends under water for about 15 feet, having a depth of 3 feet on it.

Light.—At the root of the jetty, from an iron lamp-post, is exhibited an unwatched fixed white light, which is visible 2 miles.

Mooring buoys.—Two mooring buoys have been established in St. Pauls Bay at 1,100 yards 28° and 480 yards 14° , from the lights on the jetty near the head of the bay.

Examination anchorage.—An area for the examination of vessels, under the circumstances described in Appendix I, has been appropriated in St. Pauls Bay, inside the line joining the entrance points, Selmunet and Ras il Kaura.

Vessels inconvenienced by searchlights.—For signals to be made see page 477.

Communication.—Torri Kaura, 42 feet in height, and 500 yards westward of Ras il Kaura, is a pink watchtower, marked by a pole surmounted by a diamond, also by a vertical black stripe (partially obliterated) on its northern and eastern fronts; the top of the tower is 87 feet, and of the beacon 106 feet above high water; it is in telegraphic communication with Valletta.

Coast.—Between Ras il Kaura and Madalena Point the coast is low and irregular, forming several small bays, which are too con-

fined and foul to be used as anchorages; they will, however, be found useful for boats, and landing is generally practicable. The principal features are Salina Bay or Benuarrat, the head of which are the Government salt works; Ras il Ghallis, having Torri il Ghallis, white, and 39 feet high, on it, and off which there is a low islet, Il Gzeira tal Ghallis; Kalet San Marcu, with Torri San Marcu, pink, and 38 feet high, on Ras il Kreiten, from which eastward distant 800 yards there is Marcu Shoal, with 4 fathoms water over it; and Bahar ich Chaghak and Madalena Point, 800 yards westward of which latter stands Torri Madalena, white and 40 feet high.

Signal station.—At Jebel San Pietru, 1.1 miles southward of Torri San Marcu, there is a signal station, 477 feet above the sea. It is locally known as Gargur.

Radio station.—A radio mast, belonging to the Eastern Telegraph Co., is situated 850 yards south-southwestward of St. Georges Tower.

Rifle range—Buoys.—Three red conical buoys, the center one surmounted by a staff and cage, the northwestern buoy by a cross, and an inverted V on the southeastern buoy, are moored to the northward of Madalena Point to mark the limit of the dangerous zone from the rifle fire from the ranges between Madalena and St. Georges. They are about 1,400 yards apart and lie about 1.3 miles from the coast.

A red flag will be hoisted at Torri Madalena and St. Georges Tower as a warning that rifle practice is going on, and vessels should pass to the northward of the buoys.

St. Georges Shoals.—From St. Georges Bay, 2 miles to the northward of St. Elmo Light Tower, a rocky bank extends nearly $\frac{3}{4}$ mile from the shore, with three shallow patches on it, named, respectively, Outer, Middle, and Inner St. George Rocks.

The outer shoal has 5 fathoms water over it and lies 37° 1,100 yards from the tower on St. Georges Point.

The inner shoal, with a depth of 3 fathoms over it, lies 600 yards from St. Georges Tower.

The middle shoal with $4\frac{1}{4}$ fathoms water is nearly midway between the other two.

Clearing marks.—St. Paul's Church spire in range with the eastern steeple of St. John's Church, bearing 167° , leads to the eastward of the shoals, and Torri San Marcu in range with Palazz Selmun, 282° , leads to the northward in 8 fathoms water. These clearing marks lead inside rifle-range buoys.

With the above exceptions the northeast coast of the island is clear of out-lying dangers, and if necessary be approached to a

distance of $\frac{1}{2}$ mile; but in standing towards the shore a sailing vessel should tack on the first shoal cast if the lead.

Directions.—Vessels from the westward often experience a set to the southward, and in sighting the land, Gozo is observed on the port instead of the starboard bow; therefore, in approaching these islands, especially with the wind from the northwestward, a sailing vessel should steer rather to the northward of them. If bound to Valletta, run along the northern side of Gozo at any convenient distance according to the wind and sea, as it is bold and clear of off-lying danger.

During bad weather and a heavy sea Guirdan Lighthouse (Gozo) should be kept open and not brought to bear more than 290° to avoid the northern part of Secca il Baida or Balls Bank (which is said to break in bad weather); but with smooth water a vessel of moderate draft may pass over it.

When past Secca il Baida a course may be steered to pass at a distance of $1\frac{1}{2}$ or 2 miles along the north coast, and when St. Paul's church is in range with the east steeple of St. John's church, bearing 167° . St. Elmo may be steered for. (See directions for entering Valletta Harbor at p. 484, and directions from Malta to the westward, p. 500.)

Harbors.—**Marsa Musciet**, known as Quarantine Harbor, situated on the northwestern side of Valletta, extends upward of $1\frac{1}{2}$ miles and terminates in two creeks, separated by Pieta Point; the harbor, though narrow, is deep, having from 5 to 18 fathoms water, except near the shore and at the head of the creeks.

The entrance between the shore of St. Elmo and Tigne Point is about 400 yards wide, and within, on the northwestern side, the harbor is divided into Sliema and Lazaretto Creeks by Jezirah Island, which lies nearly in the center, and on which is Fort Manoel and the Lazaretto. The island is connected to the shore by a bridge, and narrows the harbor to less than 300 yards.

Lights.—At Fort St. Elmo a white tower, 59 feet in height, exhibits, at an elevation of 167 feet above the sea, a fixed white light, which is visible 15 miles.

On Tigne Point, at the northern side of entrance to Marsa Musciet, a square stone tower exhibits two fixed white lights placed vertically. They are elevated 65 and 80 feet, respectively, above the sea, and are visible 4 miles. (For arc of visibility see Light List.)

A fixed white light is exhibited from an iron staff on Fort Manoel, 38 yards within the eastern extremity of Jezirah Island, at an elevation of 21 feet above the sea, and is visible 2 miles. (For arc of visibility see Light List.)

Dragut Point—Buoy.—A red spar buoy is situated 150 yards eastward of Dragut Point.

Submarine mines.—When submarine mining practice is taking place, northward of Dragut Point, the area is marked by green buoys.

Dragut Shoal, having a depth of 5 fathoms over it, lies 700 yards northeastward of Fort Tigne Lighthouse.

Ferry.—A steam ferry runs from St. Paul steps to the northern side of Sliema Creek.

Buoy.—A red spar buoy marks the extremity of shoal water off public baths.

Mooring buoys, the positions of which are marked upon the charts, are placed in Sliema and Lazaretto Creeks.

Sliema Creek—Petrol regulations.—Whenever one of the British auxiliary cruisers, or submarines, is discharging or taking in petrol at the store, Fort Manoel (old torpedo pier), in Sliema Creek, a red flag will be hoisted at the end of the pier. Two mooring buoys for berthing petrol-carrying vessels lie off the pier.

While the flag is flying, all vessels are to keep outside a radius of 250 feet, and steamers going up or down Sliema Creek should always pass on the northern (Sliema side) of Nos. 1 and 2 large mooring buoys in the middle of the harbor.

For the convenience of the local ferry service only, two red buoys will be dropped marking the exact radius they should keep outside these buoys.

Grand Harbor.—The Grand Harbor of Valletta, entered between the breakwaters extending from St. Elmo and Ricasoli Points, a distance of about 400 yards, is commodious and safe; it extends to the southwestward along the southern shore of Valletta and Floriana for about $1\frac{3}{4}$ miles. Within the entrance, on the southeastern side of the harbor, is Bighi Bay, with Calcara Creek at its head, and farther in Dockyard and French Creeks, which each extend about 1,200 yards. The extremity of the peninsula forming these creeks extend to within less than 400 yards of the shore of Valletta, thus reducing the breadth of the harbor.

Within the harbor the water, everywhere sufficiently deep for the largest vessels except at the Marsa or head of the harbor, ranges from 14 to 5 fathoms as far up at Gun Wharf Point, thence from $4\frac{1}{2}$ to 3 fathoms to the head of the harbor.

Breakwaters.—From St. Elmo Point a breakwater extends in an easterly direction, with a curve to the southeastward at its eastern end, for a distance of 500 yards; the 10-fathom curve extends parallel with that breakwater at a distance of 200 yards from it on the northern side, and 100 yards from the southern side.

From Ricasoli Point a breakwater extends in a northwesterly direction for a distance of 120 yards.

Lights.—From a white circular tower, with a red horizontal stripe on the eastern side, on the outer end of St. Elmo Breakwater, is exhibited, at an elevation of 60 feet above the sea, a flashing white light, visible 12 miles.

From a white cylindrical stone tower 30 feet in height, with two horizontal stripes, the upper red and the lower white, painted on the eastern side, erected on the outer end of Ricasoli Breakwater, is exhibited, at an elevation of 40 feet above the sea, an occulting red light, visible 10 miles.

At the head of the Marsa a fixed red light is shown from the point at the foot of Jesuit Hill, and a fixed green light near the boat shed on the opposite point.

Buoys.—The following red spar buoys lie in the harbor:

One, in 33 feet of water, distant 200 feet, 290° , from Isola Watchtower, and another, in 32 feet of water, at a distance of 240 feet, 8° , from the same tower.

One, about 70 yards eastward of the Gun Wharf, marking the extremity of the shoal water off that point.

One, about 70 yards northward of Ras Hanzir (Magazine Point).

Mooring buoys, the positions of which are marked upon the charts, are placed in Grand Harbor, Bighi Bay, Dockyard, and Calcara Creeks.

Dockyard and French Creeks are exclusively for the use of British Government vessels, and along the shores of the inner part of Dockyard Creek are the dock and victualling yards; at its head is No. 1 dock, two dry docks in line of, and entering from one another.

On the eastern side of French Creek are Hamilton, No. 2, and Somerset, No. 3, docks; at the head Nos. 4 and 5 docks; and on the west side the naval store depot and water tanks at Corradino Point. The channel to the docks at the head of French Creek is being dredged to a depth of 35 feet, and the depth alongside the wharves to 32 feet.

Wharfage.—The various Government wharves (1912) afford accommodation of a total length of 3,830 feet dredged to a depth of 32 feet, and of 460 feet dredged to a depth of 30 feet.

Pilots.—Pilot boats are distinguished by a red and white horizontal flag, and the words "Pilot boat" painted on the bows. In fine weather they board vessels outside the harbor.

Directions.—No special directions are necessary for entering the harbors of Valletta; there are no dangers, and ordinary precaution is all that is required.

The approach to the Grand Harbor is exceedingly picturesque and interesting, and the fortifications most imposing. Passing St. Elmo Lighthouse and Fort on the starboard hand, and rounding the end of St. Elmo Breakwater, Fort Ricasoli and its breakwater will

be seen ahead; farther in the naval hospital, then Fort St. Angelo, with the town of Vittoriosa, and lastly Isola Point and the town of Senglea or Isola. These towns unite with that of Burmola or Conspicua on the southward, and the whole are surrounded on the land side by double lines of fortifications.

Under all circumstances it would be prudent for vessels of deep draft to avoid Dragut Shoal. The passage over this shoal is not safe during a gregale (northeast gale) or when there is a heavy sea running.

The light staff on Jezirah Island in range with Tigne Point bearing 248° , will lead to the southeastward of Dragut Shoal; flagstaff on Fort St. Angelo in range with the viaduct between the two parts of St. Elmo Breakwater, bearing 198° , lead eastward of the shoal.

When inside St. Elmo Breakwater the beacon on Corradino Hill kept in range with the watch tower on the northwestern angle of the fort on Isola Point, bearing 217° , leads up the harbor, and about 50 yards southeastward of the shoal water off L'Imgherbeb Point.

A sailing vessel, entering the Grand Harbor with westerly winds, should keep the upper sails set to catch the flaws over the houses. With head winds it is, however, very difficult for a sailing vessel to enter, but as the sea under the land is smooth, by standing close-in, the assistance of a tug can be obtained.

If forced to run for the port with a heavy breeze from the northeastward, great caution is necessary if entering the Grand Harbor, as on coming to the wind, the vessel's broadside is presented to the heavy sea then running at the entrance, and there is danger of being thrown upon the breakwater. Under such circumstances it is better to run for Marsa Musciet, when the sea will be aft, but since the building of the breakwaters there is a troublesome sea off the entrance, owing to the rebound.

In northeastern gales pilots can not get out, and the position of the buoys must not be relied on, as they are liable to break adrift.

Valletta, the capital of the island, stands on a promontory forming a sort of ridge about 110 feet above the sea, nearly $1\frac{1}{2}$ miles in length, and $\frac{1}{2}$ mile in breadth, which slopes on each side to the sea, separating the Grand Harbor from that of Marsa Musciet, and having at its extremity the fort and light tower of St. Elmo. It was founded in 1566 by the famous grand master, John de la Valletta.

The houses are well built, with flat roofs, the streets are wide, and at right angles to each other, with commodious footpaths on each side, while a road runs around the whole city between the houses and fortifications. The ground on which the city is built is so steep that many of the streets leading to the Strada Reale consist of a flight of stairs.

The public buildings are the palace, university, treasury, the churches of St. John and St. Paul and several other churches, barracks, several hospitals, the opera house, palace of justice, library, museum, etc., all of which are well and neatly built; the church of St. Paul, with its tall spire, was the gift of Queen Adelaide, and is a conspicuous object. Between Valletta and the inner lines of the fortifications is the suburb of Floriana, with the public gardens, parade ground, etc.

Water is supplied by an aqueduct, but every house has a tank for rain water, and there are numerous wells. Granaries are excavated in the rock for the safe-keeping of grain.

Communications.—The Peninsula and Oriental Co.'s steamers for London, and the Moss Line of steamers for Liverpool, call fortnightly; two services of steamers daily to Gozo.

A railroad connects Valletta with Citta Vecchia, a distance of 8 miles.

An electric tramway runs from Floriana to Birchircara, Zebbug, and around the head of the Grand Harbor to the dockyard.

There is telegraphic communication with all parts by cable: the inland telegraph system is the property of the military authorities. The telegraph office is always open. The governor's palace and all public departments are connected by a telephone service, and the Island of Gozo can be communicated with from the Auberge de Castille through the military telephone.

Consul.—The United States is represented by a consul and vice consul.

Submarine telegraph cables.—Submarine telegraphic cables are laid between Malta and the following places: From Valetta to Bona, Gibraltar, Pozzalo, in Sicily, and Alexandria; these cables are connected with Valletta by land lines, also by submarine cables crossing Sliema Creek and Julian Bay; a cable to Tripoli on the south. A submarine telephone cable crosses the entrance to Grand Harbor from Ricasoli Lighthouse to St. Elmo Breakwater Lighthouse, and another from L'Imgherb Point to St. Angelo.

Coal and supplies.—All coal is kept at the Marsa. An aggregate amount of about 60,000 tons of coal is kept in stock by various firms, and 5,000 tons could be put on board in 24 hours; coaling is carried on by baskets, and there are 700 lighters, holding from 25 to 30 tons each, 200 being kept ready loaded, and 7 steam launches. The coal wharf, 2,500 feet in length, has depths of from 12 to 15 feet alongside; colliers generally lie alongside lighters, the coal being carried across them.

All naval coal is kept at the Marsa, and some patent fuel at Imsida.

Provisions and stores are abundant. Water is supplied to all Gov-

ernment vessels from the naval reservoir by tank vessels. Merchant vessels receive it also by tank vessel.

Trade.—The exports of local produce consist of potatoes, onions, cumin seed, vegetables, oranges, cotton, goats, mules, and Malta free-stone; and the principal imports are wheat, manufactured grain, wine, cotton goods, spirits, beer, and bullocks; 330,000 tons of coal are imported annually.

Docks.—There are two double and four single Government docks in Dockyard and French Creeks, a hydraulic dock at Ħmsida Creek, and a patent slip at French Creek, and one at the Marsa. For particulars see Appendix I.

Repairs.—Machinery of the largest battleships can be repaired, and engines of 1,200 horsepower have been made. A hydraulic crane will lift 160 tons; a steam crane 40 tons; also cranes to lift 20 to 50 tons; sheers, 30 tons; and several smaller cranes. There are a number of steam hammers, the largest being 50 hundredweight.

Hospitals.—In addition to the naval and military hospitals there is a hospital for seamen at Floriana.

Lloyd's signal station.—A Lloyd's signal station is situated at the palace tower, Valletto.

Signals.—No vessel is permitted, during nighttime, to make use of any private signals off any bay or creek of the islands; the only authorized signals being: (a) A vessel requiring a pilot to burn a blue light; (b) A vessel in distress to use the signal authorized under the merchant shipping act.

When any British naval vessels are entering or leaving the harbors a blue and white flag, with a red flag above, will be hoisted on the customhouse, for the Grand Harbor, and on the police station at Marsa Musciet, for that harbor, as a warning that all fishing nets near the fairways are to be removed.

A red flag hoisted at Castille signal station, customhouse flagstaff, or palace tower flagstaff denotes that a naval vessel is entering or leaving the Grand Harbor. While this flag is flying vessels are not permitted to leave their berths or enter the harbor.

When artillery practice is being carried out at night two green lights, hoisted vertically at the masthead of the Castille signal station, indicate "If you wish to enter harbor, enter as soon as possible."

Radio station.—A radio station has been established at Malta, open to the public at all times. The call letters are V P T. The service may be suspended for short periods, and the station is subject to be closed at short notice.

Time signal.—A time ball is dropped daily at noon from the flagstaff on the Auberge de Castille, Valletta. The ball is hoisted close up at 23h. 57m., and dropped by electricity at 0h. 0m. 0s. mid-European time, corresponding to 23h. 0m. 0s. Greenwich mean time.

A gun is fired by the same circuit which drops the ball, at the upper Barracca saluting battery.

Should either the gun or ball fail in accuracy, the ball will be dropped again 0h. 10m. 0s. mid-European mean time. The gun will not be fired a second time.

Harbor regulations.—Port regulations, and regulations as to landing men from foreign naval vessels and transports, are given in Appendix IV.

Quarantine regulations.—Vessels not permitted to enter the harbor are allowed to communicate, in quarantine, with the islands Comino and Comminotto, under such restrictions as the collector of customs may direct.

Some vessels are allowed to enter Quarantine Harbor to coal and take in provisions under quarantine restrictions.

Tides.—It is high water, full and change, in Valletta Harbor, at 3h. 30m.; springs rise from 10 to 14 inches, approximately.

Southeast coast.—From Fort Ricasoli the coast of Malta trends to the southeastward for 3.2 miles to Ponta tal Zonkor, the coast rising, with a gradual slope, from the water's edge to the ridge running parallel to it, which is from 150 to 250 feet above the sea; at 1,200 yards from Fort Ricasoli is a small creek named Calanca tal Patriet, in which, at Wied il Hammick and close to the shore, is situated a rifle range.

Rifle range—Buoys.—Two red conical buoys, surmounted by a triangle, on the southeast buoy, are moored about 1 mile off the creek to mark the limits of the fire zone from the rifle range.

Lines drawn from the head of Calanca tal Patriet, through these buoys, inclose the dangerous area, and two danger flags are shown, while firing is going on to seaward, from flagstaffs surmounting two small white lookout houses, one on each side of the creek.

Prohibited Fishing Ground.—A beacon lies near the coast, about 400 yards northwestward of the same measured mile beacon, and another beacon lies near the coast close eastward of the northeastern extremity of Fort Ricasoli.

Fishing is prohibited inside the area comprised between lines drawn between the western rifle-range buoy and the beacon eastward of Fort Ricasoli, and between the rifle-range buoys and from the eastern rifle-range buoy in a 175° direction to Ras-el-Jebel.

Measured mile—Beacons.—Between the entrance of Valletta Harbor and Ponta tal Zonkor, is a measured mile marked by beacons. Length, 6,080 feet; course, 309°.

The western pair of beacons, situated 1,500 yards southeastward of Calanca tal Patriet, are masts, the outer surmounted by a black staff and diamond, the inner by a staff and ball.

The eastern beacons are similar, but the inner beacon is surmounted by a globe; the walls of the fields intervening are marked with two white stripes, which are in line with the two beacons in transit. Torre ta Trick il Wiesa, a ruined tower, 32 feet in height, stands near the outer of the eastern beacons.

Della Larga Forca, a bank with a least depth of 5 fathoms, lies with Torre ta Trick il Wiesa bearing 242° , distant 700 yards; the bank extends in a northerly direction from this position to the 10-fathom curve for a distance of 600 yards; there is a channel about 400 yards in width, between the 5-fathom bank and the shore, in which the depths are 9 fathoms, but deep-draft vessels are recommended not to use it.

The eastern measured mile beacons in range lead over the 5 fathoms on Della Larga Forca.

Ponta tal Zonkor, on the northern side of the entrance to Marsa Scala, is low, and has a beacon, presently described, standing 200 yards from its extremity.

Zonkor Reef, a rocky shoal about 200 yards in width, between the 5-fathom curve, stretches 800 yards southeastward of the point; here there is a depth of $4\frac{1}{2}$ fathoms, with $5\frac{1}{2}$ to 6 fathoms immediately to the southeastward.

A rocky head, with 5 fathoms least water over and 15 to 20 fathoms close seaward of it, lies 900 yards eastward of Ponta tal Zonkor.

Marsa Scala, the narrow inlet between Ponta tal Zonkor and Il Gzira, is about 1,300 yards deep and 700 yards wide at its entrance. The water shoals suddenly just inside the entrance from 5 to 2 fathoms, thence to $\frac{1}{2}$ fathom at its head.

Fort St. Thomas, an old castle, is a white rectangular building, 85 feet in height, with corner turrets, and stands on the southern side of the entrance to the Marsa.

Beacons.—On the northern side of the entrance to Marsa Scala, and 200 yards westward of Ponta tal Zonkor there is a stone beacon, with black and white horizontal bands.

On the extremity of Il Gzira, the southern point of entrance, a red iron beacon, 17 feet in height, is surmounted by a staff and cage.

Ir Ramla ta San Tumas, or St. Thomas Bay, formed between Il Gzira and Ponta tal Munsciar, is nearly $\frac{3}{4}$ mile wide, and 1,200 yards deep, with $4\frac{1}{2}$ and 5 fathoms water in the center; it is foul and rocky, the bottom consisting of sand and rocks covered by weed; there is a sandy beach at its head. A sunken rock, with a depth of 8 feet over it, lies near the center of the bay, 500 yards 317° , from the extremity of Ponta tal Munsciar; like Marsa Scala this bay is completely open to the eastward.

Ponta tal Munsciar will be known by its being the northern point of a range of high white cliffs; the point terminates in rocks, from which a reef, with several heads of less than 6 feet water, extends east-northeastward for a distance of 750 yards.

Secca il Munsciar, about 400 yards in extent, with $1\frac{1}{2}$ fathoms least water over it, and 6 to 8 fathoms around, lies about 1,600 yards eastward from Ponta tal Munsciar. Between this reef and that extending from Ponta tal Munsciar is Munsciar Pass, with 4 fathoms in mid-channel; the bottom of the pass is uneven and rocky.

Zonkor Beacon in range with Il Gzira Beacon, bearing 333° , leads through the center of the pass in 4 fathoms water. Dellimara Lighthouse, just open of Shirob il Ghagin, bearing 211° , also leads through the pass in 4 fathoms water.

Outer Munsciar Rock, having a depth of $5\frac{1}{2}$ fathoms, lies east-southeastward, distant nearly 800 yards, from the shoalest part of Secca il Munsciar.

The irregular outline and uneven depths on the bank, which extends $1\frac{1}{2}$ miles eastward of Ponta tal Munsciar and around these reefs, cause a heavy sea during easterly winds, when a vessel should give them a wide berth.

Buoy.—A red conical buoy, surmounted by a staff and two cages placed vertically, is moored on the northern side of Outer Munsciar Rock.

Clearing marks.—St. Elmo Lighthouse, open northeastward of Ricasoli Ridge, bearing 299° , or St. Elmo Breakwater Light, visible, bearing 303° , leads 1 mile to the northeastward of Secca il Munsciar; and Dellimara Lighthouse, bearing 233° , leads southward of it.

Shirob il Ghagin, $\frac{1}{2}$ mile southward of Ponta tal Munsciar, is low and projecting, with a ruined tower, which is gradually disappearing, standing on it; the coast between, of high white cliffs, forming a bay, and rising at its head to 145 feet above the sea, this being the highest cliff to the northward of Dellimara Point.

To the southward of Shirob il Ghagin are two small bays named, respectively, Cala ta Lihfar and Zgheira in the form of a horseshoe, with high white cliffs at their heads; thence on to Dellimara Point the coast is irregular and cliffy.

Signal station.—Fort ta Silc Signal Station, 223 feet above the sea, is situated about $\frac{3}{4}$ mile westward of Shirob il Ghagin Tower, and is conspicuously marked by a flagstaff and semaphore.

Marsa Scirocco.—The entrance to this bay, between Dellimara and Binghaisa Points, is about 1 mile wide, and widens slightly within the entrance; it extends about $1\frac{1}{2}$ miles to the northward and northwestward, being divided at its head by the promontory of St. Lucian, which is broad, with white cliffs from 50 to 60 feet above the sea, and on which stands Fort St. Lucian, a large square building

with corner turrets. A small rock, Hajra, 2 feet in height, with foul ground around it, lies 300 yards southeastward of the promontory.

On the eastern side of the bay the coast, for a little more than $\frac{1}{4}$ mile northward of Dellimara Point, is a bold yellow cliff, from 70 to 120 feet above the sea; thence it becomes less precipitous, until $\frac{1}{2}$ mile farther northward it again breaks on to the high white cliff named Il Hotba tal Bies, 152 feet above the sea.

The coast on the western side of the bay is low and rises gradually towards the interior of the island; there are the ruins of several old batteries and fortifications on this side of the bay.

Dellimara Point, terminating in a cliff 50 feet above the sea, has a square white tower, 35 feet in height, standing on it, and forms the eastern side of the entrance to Marsa Scirocco. Lying close to the southward of the point is Il Taktigha ta Marsa Scirocco, a small low islet, 13 feet above the sea and foul for the distance of 100 yards seaward.

Lights.—At the distance of 400 yards from the extremity of Dellimara Point is an octagonal tower, 80 feet in height, surmounting a dwelling; it exhibits, at an elevation of 151 feet above the sea, an alternating revolving red and white light, showing red and white alternately, and is visible 15 miles. (For arc of visibility see Light List and chart.)

On the southern face of Fort St. Lucian an iron structure, 12 feet in height, exhibits, at an elevation of 127 feet above the sea, an unwatched fixed white light, visible 6 miles. (For arc of visibility see Light List and chart.)

A fixed red light is occasionally shown on Cala Frana torpedo depot pier.

Beacon.—An iron beacon, painted in red and white horizontal bands, with a red triangular topmark, is situated on the point north-eastward of Fort St. Lucian.

Binghaisa Point, on the western side of the entrance to Marsa Scirocco, is low and has a square pink tower, with a vertical black stripe on its eastern face, 40 feet in height, standing on it; there are also the ruined walls of old fortifications.

Binghaisa Patch, lying 600 yards southward of Binghaisa Point, is a rocky shoal about 300 yards in extent, with 3 fathoms least water over it; there are depths of from 4 to 6 fathoms between the shoal and the shore.

Binghaisa Reef is a rocky shoal extending about 700 yards in a northwest and southeast direction, with shoal heads on which the depths are from 3 to 5 fathoms; the reef rises gradually on its eastern side, but falls abruptly at its western edge to depths of 20 and 30 fathoms. The northwestern end of the reef is 900 yards south-

eastward of Binghaisa Patch, with depths of from 7 to 10 fathoms between them.

The outer head of 3½ fathoms lies 1 mile southeastward of Binghaisa Tower.

The sea breaks heavily on the reef with on-shore winds, but they afford some shelter to Marsa Scirocco with southerly winds.

Clearing marks.—Torri tal Wied Zurriek kept open of land bearing 288°, leads to the southward of Binghaisa Reef. The Capucin Convent, on the ridge southward of Zeitun, in range with the center of Fort St. Lucian, bearing 334°; or Zeitun Church well open to the eastward of the same, leads to the eastward.

Cala Frana—Torpedo range.—Cala Frana is a small bay situated on the southern side of Marsa Scirocco, westward of Binghaisa Point. The torpedo depôt is erected on its western shore, a pier, 570 feet long, extending in a northerly direction; this pier is used for running torpedoes from, and has a length of 60 feet at its head, with a depth of 33 feet alongside. Two mooring buoys, for the use of petrol vessels, lie off the pier. The torpedo range, with its various mark buoys, extends for a distance of 2 miles in an east-southeasterly direction southward of Dellimara Point. The danger limits of the range when in use are marked by circular red buoys, each surmounted by a staff and globe; there are a number of beacons erected on shore used in connection with the marking of this range. A small concrete jetty is situated on the western shore of Cala Frana for landing stores, etc.; there is depth of 12 feet alongside.

The torpedo depôt is in telephonic communication with Valletta; a large water tower stands on its side, and forms a conspicuous object. A breakwater, 290 feet long, extends in a northwesterly direction from the outer bend of the eastern shore of Cala Frana for the protection of small craft belonging to the depôt. Several rocky heads, with varying depths of from 2 to 6 feet, are scattered about the center and toward the head of the bay, so that nothing larger than a boat should at present attempt to use Cala Frana for shelter purposes, and torpedo boats using the jetty on its western shore should exercise caution, as the water shoals very rapidly on the inside of the jetty.

The torpedo range buoys are not to be depended upon for navigational purposes, as the four outer buoys are only laid down when long ranges are in use, and the raft moorings depend on the weather.

Mooring buoys.—There are two mooring buoys in Marsa Scirocco; their positions will be seen on the chart.

Anchorage.—Marsa Scirocco is clear of danger, with from 10 to 13 fathoms water in the center, the soundings diminishing gradually toward the shore. The northeastern arm is shallow, and a nar-

row bank surrounds this part of the bay. Marsa Scirocco is a very safe harbor, except with southerly winds, and even these seldom blow home; the bottom is fine sand and mud between patches of hard ground covered with weed, and affords good holding ground; small vessels generally anchor off the eastern shore, with Fort St. Lucian bearing about 283° .

Examination anchorage.—An area for the examination of vessels, under the circumstances described in appendix III, has been appropriated in Marsa Scirocco “inside the line joining Binghaisa and Dellimara Points.”

Vessels inconvenienced by searchlights.—For signals to be made, see page 477.

Directions.—Vessels bound to Marsa Scirocco from the north-eastward may round Dellimara Point at any convenient distance; but from the southward and westward should attend to the clearing marks.

At night, Dellimara light should be kept bearing westward of 356° until Fort St. Lucian Light bears 334° .

Current.—About 1 mile off the entrance to Marsa Scirocco a very strong current setting to the northeastward has been experienced. It apparently was caused by several days of southeasterly winds, as it ceased after two days' westerly winds.

Villages.—The village of Marsa Scirocco lies at the head of the northeastern arm of the bay, with two small churches and several conspicuous houses and the two small villages of San Giorgio and Birzebbugia, separated by the low promontory, Il Gzira, are on the western side of the bay. There is a landing place for small boats drawing 4 feet at the police station, on the northern side of the bay, in which Birzebbugia is situated.

Zeitun.—The town of Zeitun, with its conspicuous church with red dome, and two spires, stands on ridge of the hill, $1\frac{1}{2}$ miles northward of Fort St. Lucian; $\frac{1}{4}$ mile southeastward of Zeitun Church is the low white dome of the church of San Gregorio.

Situated on the ridge, about 1 mile westward of Zeitun, is the town of Ghashiak, having a church with dome and two spires, and $\frac{1}{2}$ mile farther westward is the old signal tower, round, 55 feet in height and standing at the eastern end of the village of Gudia, which has a church with a dome and two spires.

On the ridge, nearly 1 mile northward of Fort St. Lucian, is the Capucin Convent, a large dark house, which, with Fort St. Lucian, forms a clearing mark for Binghaisa Reef, when entering the bay.

Submarine telegraph cable.—A telegraph cable from Malta to Tripoli runs through Marsa Scirocco, and is landed in Cala San Giorgia.

Hurd Bank lies 11 miles eastward from the entrance of Valletta Harbor. It is about 4 miles long northeast and southwest, and about 2 miles in breadth; on it are depths of from 23 to 27 fathoms over sand and coral bottom.

Southwest coast.—From Binghaisa Point the coast trends to the westward, and for a distance of $3\frac{1}{2}$ miles, as far as a bold headland, named Cap tal Baitar, is a continuous range of high precipitous cliffs, gradually increasing in height from 100 to 300 feet above the sea.

From Cap tal Baitar to Torre tal Wied Zurriek, a distance of 1 mile, the cliffs are still high, but more broken and less precipitous and much darker in color. Negret Mill, standing on the high land above Cap tal Baitar, 519 feet above the sea, is a conspicuous object.

From Torri tal Wied Zurriek, a square pink tower, 38 feet in height, to Kalp is Sabia the land is lower and there are no cliffs of any height, but the coast rises steeply from the water's edge to the summits of the hills, $\frac{1}{4}$ mile back, which are about 450 feet above the sea.

Ras il Hamriah, $\frac{3}{4}$ mile westward of Torri tal Wied Zurriek, is an irregular projection from the coast, and, on the side of the hill above it is Torri Hamriah, 34 feet in height and of a yellow color. One mile westward of Ras il Hamriah and close to the shore is a small rock, 2 feet above the sea, named Hajra is Seuda.

Hamriah Bank, in approximately latitude $35^{\circ} 49' N.$, longitude $14^{\circ} 26' E.$, with general depths of from 5 to 10 fathoms, fronts the coast between Ras il Hamriah and Hajra is Seuda, extends 1,200 yards from the shore, and is very rocky and uneven, with several shoal heads of from 3 to 5 fathoms over it.

The eastern head, with a depth of 3 fathoms, lies with Torri Hamriah bearing 17° , distant 900 yards. There is a depth of $4\frac{1}{2}$ fathoms 400 yards westward of this position and $4\frac{1}{2}$ fathoms 400 yards north-westward of it.

The western head, with a depth of $4\frac{1}{2}$ fathoms, lies with Torri Hamriah bearing 86° , distant 1,700 yards; there is a depth of $5\frac{1}{2}$ fathoms 400 yards southeastward of it.

A rock, with 5 feet least water over it, lies southwestward of Torri Hamriah and at about 200 yards from the shore.

Nowhere along this coast is there any sheltered anchorage, but, with the exception of Hamriah Bank, it is clear of danger and steep-to, the 50-fathom curve of soundings being within $\frac{1}{4}$ mile from, and in places close to, the cliffs, except the bank, which extends from the coast to Filfolia Island and $\frac{1}{2}$ mile southward of it.

Current.—With fresh westerly or northwesterly winds, a current setting along the shore to the westward is sometimes experienced; this current extends from $\frac{1}{2}$ to 1 mile from the shore, with a velocity of from $\frac{1}{2}$ knot to 1 knot an hour.

Filfola Island, $2\frac{1}{2}$ miles southward of Ras il Hamriah, and $2\frac{1}{2}$ miles from the coast, is clifty, rocky, and 190 feet above the sea; it is 400 yards long, east and west, and 200 yards broad. Two rocks, 51 and 29 feet above the sea, respectively, lie at its western end, to which they are nearly united; there is a rock awash 134 yards westward of the western rock, and a small rock, 2 feet above the sea, lies at the eastern end of the island.

Stork Rock, with a least depth of $3\frac{3}{4}$ fathoms, and 7 to 20 fathoms close around, lies 800 yards southward of Filfola Island; and two patches, with 3 fathoms water over them, lie between Stork Rock and the island.

Coast.—From Kalp is Sabia the coast trends to the northwest to Ras ir Raheb, a distance of $6\frac{1}{2}$ miles, and is a continuous wall of high cliffs, remarkable not only for their high and precipitous character but from the fact that within $\frac{1}{4}$ mile from the coast they rise to the most elevated land of the island, culminating near the village of Dingli in a hill 845 feet above the sea, Jebel Giantar summit, 1 mile to the eastward, being only 5 feet lower.

At the foot of these cliffs are various caves or grottoes which are full of stalactites and stalagmites.

Signal station.—There is a signal station and semaphore on the summit near Dingli.

Ras ir Raheb is the northern extremity of the perpendicular cliffs which form the coast line of Malta for a distance of $13\frac{1}{2}$ miles on the south and west. The cape is precipitous, 156 feet above the sea, with deep water alongside.

Fom ir Rieh is a bight extending eastward from Ras ir Raheb for about $\frac{1}{2}$ mile. The southern side of the bight is a perpendicular cliff, steep-to, but the northern side is broken, and foul ground extends some distance from the shore.

Anchorage, with excellent shelter from easterly winds, will be found in the bay.

Beacons.—A pyramidal beacon with black and white horizontal stripes is situated at the extremity of Ras ir Raheb, and two others of a similar nature are situated near the summit of Rdum Ahmar, on the northern side of the bay. These beacons are low, hard to distinguish from a distance, and are used for calibrating purposes.

Ras il Pelligrin, 1 mile northward of Ras ir Raheb, is the extremity of Sicca tal Imjieles. The coast between this point and Fom ir Rieh consists of bowlders that have slipped from the steep slopes above, and there are many off-lying rocks inside the 10-fathom curve. Off the northern side of Ras il Pelligrin there is a rock, just awash, 100 yards distant from the coast line, so this point should be given a wide berth, even by boats.

Jneina.—On the northern side of Sicca tal Imjiesles the coast turns into the little bay of Jneina, where there is a beach and good landing, but it is too confined for vessels, which will find anchorage in Ghain Tuffiha immediately to the northward of and separated from Jneina by a remarkable looking rocky peninsula named Ras il Karabba.

Rifle range—Buoys.—Two buoys mark the limit of the danger zone of fire from the rifle range at Ghain Tuffiha, and vessels should on no account pass inshore of them. Both buoys are red conical, surmounted by a staff and cage, and moored 700 yards apart, about 1 mile seaward from the rifle butts.

Directions.—In entering Jneina the rock awash off Ras il Pelligrin will be cleared by keeping the solitary house, just above the beach, open of the extremity of Sicca tal Imjiesles, bearing about 120° ; and to anchor in Ghain Tuffiha keep in the center of the bay, and anchor when Gozo Island is shut in by the rocks under Ras il Uash, bearing 310° .

Communication.—At the heads of both Jneina and Ghain Tuffiha there are lookout towers; the former, named Torri ta Lippia, is connected by telegraph with Valletta Customhouse.

Coast.—From Ghain Tuffiha to the northward the coast is still composed of boulders, with steep slopes, and sometimes cliffs behind them. Off Ras il Uash, which forms the northern point of Ghain Tuffiha, there is foul ground, which will be avoided by vessels keeping the western part of Cominotto open westward of the rocks under Ras il Kammieh, bearing about 1° .

Ras in Nieshfa Bay is formed by the point of that name and Ras il Kammieh, about $\frac{3}{4}$ mile to the northwestward. The northern shore is bold and steep-to; the eastern side is studded with rocks or boulders. There are two mooring buoys in the northeastern corner for British naval vessels calibrating. There are also four beacons on the edge of the cliffs, and one about 300 yards inland from the northeastern corner of the bay. These beacons are used, in connection with those along the coast as far as Ras ir Raheb, for calibrating purposes.

Landing.—Between Ras il Uash and Ras il Kammieh there is only one place available for landing, which is at Il Praüet, a rocky cove on the southern side of Ras in Nieshfa; to enter the cove, boats should keep close to the cliff on the south side, as there are many sunken rocks under Ras in Nieshfa.

Ras il Kammieh is of similar appearance to the other headlands immediately southward of it, with cliffs and very steep slopes below, strewn with boulders, which also form the coast line; Ras il Kammieh rises to 410 feet above the sea. Foul ground extends from it to the westward for a distance of 600 yards, and will be cleared by

keeping the eastern extremity of Comino in range with the western extremity of Skol tal Marfa, bearing 45° .

Anchorage.—There is anchorage in the little Bay of Ich Chir-keuua, between Ras il Kammieh and Ponta tal Marfa; the bottom is sandy.

Tunny fishery.—Tunny nets are laid out during the season northward of Ras il Uash and northward of Ras il Kammieh. (For lights, marks, and caution, see p. 60.)

Ponta tal Marfa is low, with high sloping ground behind. It is steep-to on its southern side, but a ledge extends under water from the low rock off the point, named Skol tal Marfa, which should not be approached within a distance of 400 yards.

Medina Bank (in approximately lat. $34^{\circ} 57' N.$, long. $15^{\circ} 12' E$) was discovered by the British surveying vessel *Medina* in the year 1862; this bank, within the 100-fathom curve of soundings, is about 20 miles long in a north and south direction and about 16 miles broad, the bottom consisting of sand, mud, and shells. The shoalest part, 74 fathoms, lies 152° , distant 60 miles from the eastern extremity of Malta.

Isola di Linosa (ancient Algusa) lies 65 miles 142° from Pantellaria and 63 miles 259° from Cape San Dimitri, the northwest extremity of Gozo, and is inhabited by a small Italian colony employed in husbandry and who export vegetables and farm produce to Girgenti. This island, with Lampedusa and the islet of Lampion, are the Pelagie Isles of the ancients, and both belong to Italy.

Linosa, of an irregular quadrilateral shape, is about 6 miles in circuit, and the summit is a crater 528 feet above the sea; it is entirely volcanic, with an extinct crater on its northeastern side and three smaller, but not less marked, to the southward. There are three hilly ranges with good valleys between them, covered with a rich vegetation.

Monte Rosso, 610 feet above the sea, may be seen in clear weather from a distance of 30 or 35 miles, when it has the appearance of two islets, but on closing in the hills and valleys are defined. Punta Calcarella (Strepito), the southern extremity, is high and bluff, and at the distance of about 450 yards eastward from it is a small rocky shoal with $2\frac{1}{2}$ fathoms water over it; the bottom in the neighborhood is also rocky. Punta Arena Bianca (Sciarazza), the southwestern point, is low and rugged.

Light.—On Punta Beppe Tuccio (Vergogna) a white truncated conical tower, 56 feet in height, with keeper's dwelling attached, exhibits, at an elevation of 105 feet above sea, a flashing white light, visible 16 miles. (For arcs of visibility see Light List and charts.)

Village.—The village of Linosa is situated on the southwestern side of the island, about $\frac{1}{2}$ mile from Cala Pozzolana on the west coast.

Communication.—There is communication alternately every week by steamers, with Trapani and Porto Empedocle.

Supplies.—Goats, sheep, poultry, and eggs may be procured, and water from tanks, but in very limited quantity.

Landing, on a beach of fine sand, may be effected on the southern side of Cala Pozzolana.

Anchorage, over sandy bottom, may be obtained off the south coast between Punta Arena Bianca and Punta Calcarella; on the east coast at Faraglioni and the west coast in Cala Pozzolana.

Lampedusa, the ancient Lopadusa, lies 24 miles to the southwest of Linosa, and is 6 miles in length in an east-southeast and west-northwest direction, with an average breadth of 1 mile, its eastern part being the broadest; it has a population of about 2,500, of whom 500 are convicts. Its surface is level, but the coast is abrupt and rugged, except on the southeastern, where it shelves to a low shore. Monte Albero Sole, 436 feet above the sea, on the northern side of the island, near its western extremity, is the greatest elevation.

Lampedusa is composed of sedimentary calcareous formations similar to the adjacent coast.

Capo Ponente, the western extremity, is a perpendicular cliff, the land over it being 400 feet above the sea and woody; it is steep-to, and may be rounded at any convenient distance. On the southern side of the island, $2\frac{1}{4}$ miles from the cape, is Isola Conigli, 89 feet high, steep, and connected to the main island by a reef; on the southern side of the islet are two rocks, the western being low, but the islet and rocks are not seen until near, being blended with the white cliffs of the coast.

At $2\frac{1}{4}$ miles farther eastward is the entrance to Il Porto, the intermediate coast being indented with several small bays or inlets. It is all along, as far as is known, clear of danger, with from 22 to 35 fathoms water at $\frac{1}{2}$ mile from the coast.

Il Porto is about 700 yards deep, with from 12 fathoms water at the entrance, shoaling to 3 fathoms at 400 yards within, and, being open to the southwestward, a swell sets in when the wind is from that quarter. The entrance is rather more than 300 yards wide, and within there are three small, shallow bays with beaches.

Punta Guitgia, on the western side of the entrance, is bordered by a shoal which extends off about 67 yards; Punta Cavallo Bianco is clear of danger on its western side, but has shoal water extending 100 yards southward of it. On the projecting point facing the entrance, and which separates the two bays, Cala Palma and Cala Salina, at the head of the harbor, are the remains of a castle, a chapel, some

houses, and the health office. Dredging operations are in progress in Cala Salina, the depth of which is to be increased to 13 feet.

Lights.—On Punta Cavallo Bianco, the point on the eastern side of the entrance to the port, an occulting green light is exhibited, at an elevation of 59 feet above the sea, from an iron standard on a masonry building, the whole 20 feet high; it is visible 7 miles. (For arc of visibility see Light List.)

On Punta Guitgia, the western side of the entrance, a fixed red light is exhibited, at an elevation of 41 feet above the sea, from a similar structure to the preceding light; it is visible 5 miles.

Anchorage.—A large vessel will obtain anchorage about 300 yards outside the entrance, in 8 fathoms water.

Communication.—There is communication by steamer every week alternately to Porto Empedocle and Trapani, and frequently by sailing vessel with the coast of Africa, especially with Mahediah and Sfax; telegrams should be sent by steamer to Porto Empedocle.

Supplies of fresh provisions are scarce; water of poor quality may be obtained in Cala Palma.

Cala Pisana.—Punta Sottile (the southeastern extremity of Lampedusa), $1\frac{1}{2}$ miles eastward of the harbor, is low, and westward of it, formed between cliffs, is Cala Francese, with 4 fathoms water. The northeastern extremity of the island is named Capo Grecale, and the coast between it and the southeastern extremity forms a bay in which are two coves named Cala Pisana and Cala Creta; Cala Pisana is narrow, but between 400 and 600 yards deep, terminating in a steep beach. This part of the island is sheltered from westerly winds. Here, in 1551, the celebrated Andrea Doria anchored the fleet of Charles V, after an engagement with the Turks, that was followed by a gale from the southwestward.

The north coast of the island is bold and steep-to, having about 35 fathoms water, at a distance of $\frac{1}{2}$ mile.

Light.—A white octagonal tower, 56 feet in height, on Capo Grecale, exhibits, at an elevation of 213 feet above the sea, a flashing white light, which is visible 19 miles. (For arc of visibility see Light List.)

Lampion Islet (ancient Scola), 8 miles westward from Capo Ponente, the western extremity of Lampedusa, is a steep, tabled, and triangular islet, which is about 600 yards in length north and south and 300 yards in breadth; it is of the same formation as Lampedusa. Its surface is so flat that on making it from the northwestward it looks like a wall, and there are vestiges of buildings of an ancient date on its summit.

It is steep on its western, northeastern, and southwestern sides, in cliffs of from 120 to 140 feet high, shelving on its eastern side to a low point much frequented by seals. It is steep-to all around,

with from 10 to 20 fathoms water close in except at the low eastern point, from which a shoal extends off about 200 yards.

Directions from Malta westward.—Sailing vessels bound to the westward from Malta during northwest and westerly gales (instead of vainly contending against a heavy sea and strong current in the channel between Gozo and Sicily) are recommended to run to leeward of the island and stand over on the starboard tack until they sight the coast of Africa, then work to windward in smooth water as far as Cap Bon.

Should westerly gales still prevail when in the neighborhood of Cap Bon, a sheltered anchorage under it, or along the coast to the southward, is available, and from this any change of wind may be taken advantage of.

The following is by Sir William Reid, K. C. B., sometime governor of Malta and author of the well-known work on the Laws of Storms.

A residence of four years in Malta has convinced me that the gales and storms of the Mediterranean Sea follow the same general laws as the revolving winds in corresponding latitudes in the Atlantic, modified no doubt by the high land which surrounds this sea and by the African Continent. The same may be said of Malta as was said of Bermuda, namely, that after the commencement of November revolving winds of various degrees of force set in, and gradually become frequent, yet they seldom follow in such rapid succession as that one gale becomes confounded with another; light winds and very fine weather usually intervene between the passage of revolving winds, while at other times hard-blowing, straight-line winds with a high barometer intervene.

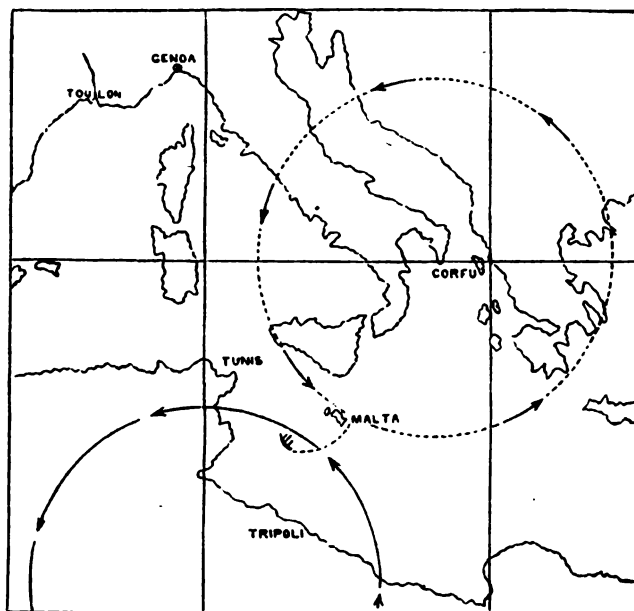
Seamen who have studied the theory of the revolving winds will be able to estimate the probable advantage they may derive from the altering of the wind during the winter season by following the course indicated by Capt. Graves.

Vessels sailing from the harbor of Valletta at that season, with the barometer rising, and a westerly wind altering and moderating, by steering southwardly would come up as the wind alters toward the north. If a calm should follow, the next breeze would, probably blow from the eastward, because at that season of the year revolving gales follow in close succession, and in their northern portion the wind is easterly.

In the following diagram a whirlwind gale passing off toward the north-east and giving a westerly wind in the Malta Channel is represented by the dotted circle. The other circle represents a new whirlwind gale coming from the southwestward, and giving an easterly breeze to a vessel to the southward of Malta.

If the circle which represents the new whirlwind gale coming from the southwestward were to be placed more to the westward and over Algeria, it would give a southwest wind to such a vessel as that marked in the diagram.

The wind in progressive revolving gales does not hold in the same quarter, but changes (except at their centers). The east wind in such a new gale coming from the southwest might be expected to change by the south toward west. A vessel under such circumstances would fall off her course and be carried toward the north. But she would be in a favorable position for taking advantage of the northwest wind, which is usually the concluding portion of revolving gales in the Northern Hemisphere.



Sicily, the most important island in the Mediterranean, is separated from the mainland of Calabria by the narrow Strait of Messina, and forms a part of the Kingdom of Italy. Its ancient name was Thrinacria, from its triangular form. The northern or longest side is about 150, the southern 140, and the eastern 100 miles in length. The western end is a rounded point, off which lie the Ægæan Islands.

That portion of the Mediterranean which bounds the northern coasts of Sicily is named Mar Tirreno (Tyrrhenian Sea), and that to the southward the Sicily and Malta Channels.

Tides.—It is high water, full and change, at 3 hours 33 minutes at six different places on the southeast coast of Sicily, with a mean range of 1 foot. Of the other places both the times and heights of tide are very irregular and vary considerably, the former as much as three or four hours from that given at the places hereafter mentioned; two causes apparently produce this variation. First, there appear to be two waves coming in different directions, with dissimilar fluctuations, sometimes giving two high waters instead of one, with a well-marked though slight depression and corresponding low water between them, and these on different days are separated by unequal intervals.

Secondly, the wind blowing on or off shore alters the level of the surface of the water, producing what may be termed "wind fluctuations," varying with its strength and direction and the formation of

the coast line; these fluctuations produce the observed difference in the times of high water. The variations in the range are as much as 15 inches. (For the tidal streams in the Strait of Messina, see p. 560.)

The Sicilian coasts are sometimes affected by a phenomenon named the *mare-moto*, which is the same in its effects at sea as the *terra moto*, or earthquake, is on shore, and appears to be owing to similar causes.

Ægadean Isles.—Off the west coast of Sicily, between Trapani and Marsala, are the islands formerly known as the *Ægades* or *Ægates* (the *Insulæ Ægates* of the ancients), consisting of *Maritimo*, *Favignana*, *Levanzo*, and the *Formiche*. They stand boldly out from the coast, and may be seen in clear weather at distances of from 40 to 60 miles.

Maritimo (*Marittimo*) (ancient *Hiera*), the westernmost of the *Ægades*, is 4 miles in length in a north-northwest and south-southeast direction, and $1\frac{1}{2}$ miles in breadth; its opposite sides are nearly parallel, and the extent of the coast line is about 12 miles. It is high and mountainous, ranging from 1,560 to 2,271 feet above the sea; nearly the whole of the western and north sides are high, steep, inaccessible cliffs, but the eastern side is lower.

Punta Troia, the northeastern extremity, is a small but prominent peninsula, with a castle on it 370 feet above the sea, and midway on the east coast is the village of *San Simone* (*Maretimo*), north-northeastward of which there is indifferent anchorage in 12 fathoms water, with the castle bearing 336° , and the highest peak 292° ; fishing vessels find shelter in the small coves around the island.

The northern side of the island is skirted with rocks, which are near the coast, but on the southwestern side, at 800 yards to the southeastward of the lighthouse, they extend 400 yards off. *Punta Bassana*, the southeastern point, is a nearly isolated mass, 623 feet above the sea.

Lights.—On the western side of *Maritimo* a rocky ridge projects about $\frac{1}{4}$ mile westward, named *Punta Libeccio*, and about 400 yards to the southward of it is an octagonal tower, 80 feet in height, and surmounting a dwelling, the whole painted in black and white horizontal bands, with "*Punta Libeccio*" in large black letters below the terrace; it exhibits, at an elevation of 240 feet above the sea, a fixed and flashing white light visible 22 miles. (For arc of visibility, see *Light List*.)

A fixed red light is shown from the pier at *San Simone* on the east coast of the island; it is visible 4 miles, but can not be lighted in bad weather.

A fixed green light is exhibited, at an elevation of 20 feet above the sea, on the slip near the village of *San Simone*.

Communication.—Weather permitting, a sailing vessel communicates three times weekly with Trapani, and there is telegraphic communication at limited hours.

Supplies.—A small quantity of fresh provisions may be obtained and water of good quality.

Submarine telegraph cable.—A telegraph cable connects Maritimo with Favignana.

Favignana (ancient *Ægusa*) is about $8\frac{1}{2}$ miles east-southeastward of Maritimo, and its eastern side 3 miles northwestward of Punta Scario, Sicily; it is about 5 miles in length in a northwestern and southeastern direction and irregular in form, its breadth varying from about $\frac{1}{3}$ of a mile to $2\frac{1}{2}$ miles; the greater part is low, but a remarkable wall-like ridge runs north and south across the island, and on its summit is Forte Santa Caterina, 1,129 feet above the sea. The population of the island is 6,400.

The level land on either side of the ridge is fertile and well cultivated, and there are several quarries in the cliffs on its eastern side. The northern, western, and southern sides are skirted here and there by a narrow bank, but the northeastern side is steep-to.

Lights.—On Punta Sottile, the western extremity of the island, a white circular tower, 126 feet in height, with a dwelling near, exhibits, at an elevation of 141 feet above the sea, a flashing white light, visible 18 miles.

A flashing white light is shown, at an elevation of 61 feet above the sea, at Punta Marsala, the southeastern extremity of the island, from a white circular tower, 39 feet in height, with a dwelling near it; in clear weather the light is visible 10 miles.

Fog signal.—A fog signal is sounded at Punta Marsala Light-house. (See Light List.)

Signal station—Semaphore.—On Forte Santa Caterina, situated on the highest point of the island, is a semaphore, by which vessels can communicate. The apparatus is on a small tower painted in black and white squares, but the semaphore is sometimes hidden by clouds.

Cala Principale lies between Punta Faraglione and Punta San Nicolo, which are 2 miles apart on the northeastern side of the island. It is the port of Favignana, and is about 300 yards wide and 400 yards deep, with depths of from $2\frac{1}{2}$ to $3\frac{1}{2}$ fathoms between the entrance point, and shoaling to 3 feet near the head. There are two bollards for securing vessels on the southern part of the rock, situated 100 yards northward of the pier.

Pier.—A small pier, about 150 yards in length, extends from the town on the eastern side of the port.

Light.—A fixed light, with red and white sectors, is exhibited from the pier end, at an elevation of 17 feet above the sea; in clear weather it is visible 3 miles, but with strong northerly winds it can not be lighted. (For sectors see Light List.)

Anchorage.—Anchorage will be found off the town, with southerly and westerly winds, in 13 fathoms water, but exposed to northerly winds, with the cupola of the church bearing 144° and the semaphore 216° .

Town.—The town of Favignana (ancient *Ægusa*) lies on the eastern side of the port. There are large fisheries here for tunny and anchovy.

Communication.—Weekly steamers to Palermo, Tunis, Porto Empedocle and Syracuse, and fortnightly with Trapani; telegraphic communication with all parts.

Supplies.—Fresh provisions in moderate quantities may be procured; water only from cisterns.

Submarine telegraph cables.—Favignana is connected by telegraph cables with Sicily and Maritimo.

Tunny fishery.—The tunny fisheries would appear to have been worked for more than 400 years, according to a slab, recording a large catch taken so far back, and attached to the church door. During the fishing season, from March to November, nets extend from a point about $\frac{3}{4}$ mile northwestward of Cala Principale, in a northeasterly direction, for a distance of about $1\frac{3}{4}$ miles; and from Punta San Nicolo in an easterly direction for a distance of about $1\frac{1}{2}$ miles. The outer end of the nets is marked with a boat painted with black and white stripes, and having a mast and flag by day, and showing a white light by night. (See Caution, p. —, and on chart.)

Anchorage.—The best anchorage is off the eastern end of the island, between Punta Rossa and Punta Morsala Lighthouse, in $7\frac{1}{2}$ or 8 fathoms water, over mud, about $\frac{1}{2}$ mile from the shore. From this anchorage to 2 miles farther northward, the depths are from 9 to 19 fathoms, over sand or gravel, and toward Punta Scario (on the mainland) for 2 miles from 9 to 6 fathoms, where during westerly winds any number of vessels will find anchorage.

Levanzo (ancient Phorbantia) lies more than 2 miles to the northward of Favignana, the channel between being deep and clear of danger. Levanzo is 2 miles in length north and south, 1 mile in breadth, and 887 feet above the sea; it is rugged, with steep inaccessible cliffs, the northwestern and southeastern ends excepted. Close to its southwestern point is Il Faraglione, a high conical rock, and near the southeastern end a tower and a few scattered houses; the soil is cultivated. The coast is clear of danger and generally steep-to.

Light.—On Punta Grosso, the northern extremity of the island, is a white circular tower, 39 feet in height, and having a dwelling near; it exhibits, at an elevation of 225 feet above the sea, a group flashing white light, visible 20 miles. (For arc of visibility, see Light List.)

Communication.—Weather permitting, a sailing vessel communicates twice every week with Trapani.

Supplies.—A small quantity of fresh provisions might be obtained; water is procured from cisterns.

Secca di Pesci is a sand bank lying 5 miles 314° from Punta Grosso Lighthouse, on which the least water is 12 fathoms; within 2 miles northward of it is a depth of 100 fathoms, which depth in a tortuous line extends close to Capo San Vito.

Sicily—West Coast.—**Capo San Vito**, the northwestern extremity of Sicily, and the usual landfall to vessels from the westward, is a low point about $1\frac{1}{2}$ miles long, lying at the foot of a rugged promontory on which is Monte Monaco, 2,296 feet above the sea. This promontory forms the termination of a lofty but narrow ridge, extending seaward from Monte Sparagio, 3,637 feet above the sea, and situated 8 miles to the southward of Capo San Vito. On the extremity of the cape is a white lighthouse, and on the shoulder of the first rise of land, Torre del Roccazzo, a square tower.

Light.—About 173 yards from the extremity of Capo San Vito is a white circular tower, 125 feet in height, with a dwelling attached; it exhibits, at an elevation of 144 feet above the sea, an alternating fixed and flashing light, visible 18 miles, the red light 14 miles. An auxiliary fixed red light is exhibited below the main light, and is visible from a distance of $2\frac{1}{2}$ miles. (For arcs of visibility, see Light List and chart.)

Shoal.—A shoal, with 16 feet water over it, lies 1,700 yards northward from the lighthouse, and depths of $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms between it and the cape, and in consequence of the abrupt rise of the bottom, the sea in heavy gales breaks on the shallow ground off the point, and is dangerous to small vessels. At $1\frac{1}{2}$ miles from the lighthouse there are depths of more than 100 fathoms, and large vessels should not round it within that distance. The auxiliary fixed red light on Capo San Vito shows over this shoal.

Baja di Vermia, between the shore of Capo San Vito and Capo Cofano, is about 5 miles wide and 2 miles deep. The water is everywhere deep, except on the southeastern shore in front of the valley sloping from Monte Sparagio, where a vessel may anchor, with off-shore winds, within $\frac{1}{2}$ mile of the land. At 3 miles southward of Capo San Vito is a small cove and beach named Cala Isoletta.

Monte Cofano is a remarkable, steep, conical mountain, 2,127 feet above the sea, rising abruptly from the coast at the southwestern extremity of Baja di Vermia. The point at its base is named Capo Cofano (Punta Barone), on which is the square tower of Agra, and 1 mile to the eastward is Vermia Islet or Rock.

Punta Pizzolungo is low, and the termination of a spur from Monte San Giuliano. About $\frac{1}{2}$ mile within the point is a remarkable sugar-loaf hill, 234 feet above the sea, and conspicuous from the northeastward.

Signal station.—On a hill near to Punta Pizzolungo is a semaphore station.

Secca Bonagia, a shoal nearly $1\frac{1}{2}$ miles in length in an east-northeasterly and west-southwesterly direction, about 800 yards in breadth, with a least depth of 6 feet, fronts the rocky shore eastward of Punta Pizzolungo; at its eastern end it is 1 mile, and at its western $\frac{1}{2}$ mile from the shore, and the 10-fathom curve is about the same distance outside it.

Tunny fishery.—Tunny nets are laid out during the season, March to November, from the shore about $\frac{1}{2}$ mile eastward of Torre Banagia, and extend northwestward for a distance of about $2\frac{1}{2}$ miles. The outer end is marked by a floating beacon surmounted by a mast by day and a white light by night. (See Caution, p. 61, and on chart.)

Isola Asinelli, 200 yards in circuit, and 6 feet above the sea, lies $1\frac{1}{2}$ miles westward of Punta Pizzolungo, and there are from 10 to 17 fathoms between it and the coast.

Beacon.—A white iron beacon, 32 feet above the sea, and surmounted by a cylinder, on the northern and southern sides of which "Asinelli" is lettered in black, stands on Isola Asinelli.

Light.—From Asinelli Beacon, at an elevation of 37 feet above the sea, is exhibited an unwatched flashing red light, visible 7 miles.

Tunny fishery.—Tunny nets are laid out, during the season, March to November, from the shore about $\frac{3}{4}$ mile southwestward of Punta Pizzolungo, and extend north-northwestward for a distance of about 1 mile. The outer end is marked by a floating beacon surmounted by a mast by day and a white light by night. (See Caution, p. 61, and on chart.)

Monte San Giuliano, the summit of which is about $2\frac{1}{4}$ miles south-southeastward of Punta Pizzolungo, is a large, rugged, conical mass rising 2,464 feet above the sea, crowned by the town of the same name (ancient Eryx), which is surrounded by a dilapidated wall with square turrets, with the ruins of a Saracenic castle at its eastern angle; it has a population of about 29,800. In rounding Capo San Vito from the eastward, the town is conspicuous on the summit of the mount.

Punta San Giuliano, a rocky projection on which is a tower, 50 feet high, and the buildings of a tunny factory, lies $2\frac{1}{4}$ miles south-westward of Punta Pizzolungo, the coast between being low and marshy, with a sandy beach.

Tunny fishery.—Off Punta San Giuliano tunny nets are laid out during the season, March to November, and they extend in a northwesterly direction about 1 mile from the shore. The outer end is marked by a floating beacon, surmounted by a mast by day and a white light by night. (See Caution, p. 61, and on chart.)

Scoglio Porcelli, lying 4.3 miles westward from Punta San Giuliano, are a small dangerous group awash, with depths of from 7 to 8 fathoms close to them, and 15 fathoms at a distance of 200 yards.

Light.—From a circular masonry tower, 79 feet high, erected on these rocks, is exhibited an unwatched flashing white light. It is exhibited at an elevation of 74 feet above the sea, and is visible 12 miles. (See Light List.)

Beacon.—In the middle of the shoal close to the lighthouse is an iron beacon, surmounted by a ball 28 feet above the sea.

Secca San Giovanni, a sand bank about 700 yards in length in a northerly and southerly direction, with a least depth of $5\frac{1}{2}$ fathoms, lies 1.1 miles south-southeastward of Scoglio Porcelli.

Formica and Maraone are two islets lying about $3\frac{1}{4}$ miles southward from Scoglio Porcelli; Maraone, the western islet, is long and narrow, with a building on it; the eastern is of irregular shape, with the buildings of a tunny factory and lighthouse on it. The islets are generally steep-to, and may be passed at a distance of 200 yards, but a shoal, with 3 fathoms over it, lies 640 yards eastward of Formica.

Light.—The lighthouse on Formica is a white circular turret, 65 feet in height over a fort, and exhibits, at an elevation of 85 feet above the sea, an occulting white light, visible 8 miles. The light is named Formiche. (See Light List.)

Tunny fishery.—Tunny nets are laid out during the season, March to November, about $\frac{3}{4}$ mile in a north-northwestern and nearly $1\frac{1}{4}$ miles in an east-northeastern direction from Formica. The seaward limits of the nets are marked in daytime by boats painted black and white with mast and flag, and by night with a white light on the boats. (See Caution, p. 61, and on chart.)

Trapani Approach.—About $1\frac{1}{2}$ miles southwestward of Punta San Giuliano a low rocky tongue of land, Punta Ligni, extends nearly $\frac{1}{2}$ mile to the northwestward, the outer part being broken into rocks or islets; the inner end forms the northern part of Porto Trapani; 400 yards within the extremity of the point is Torre Ligni.

Isola del Lazaretto lies 400 yards southwestward of the inner end of Punta Ligni, with which it is connected by a causeway, and from

the Lazaretto a cluster of low rocks and islands extends to the north-westward for a distance of 800 yards.

Secca Ballata lies 850 yards westward from Punta Ligni, and has 9 feet water on it.

About $\frac{1}{4}$ mile to the southward of Secca Ballata, and nearly the same distance from the northern extremity of rocks southwestward of Punta Ligni, is a rocky patch with 10 feet water on it, and another, with 13 feet, 300 yards farther southward. The supplementary fixed red light on Scoglio Palumbo shows over Secca Ballata and these rocks.

Isola Colombaia, 400 yards to the southward of Isola del Lazaretto, has a fort and disused lighthouse at its eastern extremity; westward of the island are two other islets; the outer one, Palumbo, also has a lighthouse on it; they are surrounded by a flat, with depths of from 1 foot to 12 feet, and at nearly 400 yards to the northeastward of Punta Ligni is Malconsiglio, 8 feet above the sea and steep-to.

Lights.—On Scoglio Palumbo, 700 yards westward of Colombaia disused lighthouse, a white circular tower, 38 feet in height, and having a dwelling attached, exhibits, at an elevation of 55 feet above the sea, a flashing white light. The light shows all round the horizon except where obscured by the land, and is visible 12 miles.

A supplementary fixed red light is exhibited from one of the windows of the lighthouse; it is visible 2 miles. (For arc of visibility, see Light List and chart.)

Porto di Trapani, formed on the southern side of the town between Isola Colombaia and the shore, is open to the southward, and the harbor extends from Isola del Lazaretto for about $1\frac{1}{4}$ miles eastward, its breadth between the Salinas and the town being about 350 yards; but the northwestern half is nearly dry, and it shoals rapidly 800 yards inside the inner breakwater.

Depths.—There are depths of 24 to 50 feet in the outer part of the harbor, 23 to 24 feet into the inner part of the harbor, and a space in the inner part, 700 yards in length and 200 yards in width, has been dredged to a depth of from 21 to 25 feet.

Dredging operations are in progress.

Secca Mauda—Buoys.—On the northern side of the entrance to the inner part of the port, about 150 yards northwestward of Punta Ronciglio Breakwater Lighthouse, is a shoal named Mauda. It is marked by two spar buoys, with black and white horizontal bands, one at each end of the shoal.

Breakwaters.—A breakwater to protect the port from the westward and southwestward extends for 280 yards southward from the southeastern angle of the fort on Isola Colombaia. A breakwater

about 200 yards in length extends in a northwesterly direction from Punta Ronciglio on the southern side of the harbor, and on the northern side a short mole has a southerly direction from near the customhouse.

Dredging.—Dredging is in progress on the northern side of the entrance to the inner port of Trapani.

Lights.—On the extremity of the breakwater at Punta Ronciglio, from an iron crane, is exhibited, at an elevation of 33 feet above the sea, an occulting green light visible 9 miles.

On the outer end of the breakwater, extending from Isola Colombaia, is exhibited, at an elevation of 31 feet above the sea, from a gray iron structure, an occulting red light visible 6 miles.

On the extremity of the Health Mole, near the customhouse, a fixed red light is exhibited, at an elevation of 16 feet above the sea, from an iron standard 13 feet in height standing on a stone base; it is visible in clear weather from a distance of 3 miles and shows over the port near the middle of the mole. (See Light List.)

Mooring buoys.—There are two mooring buoys in the outer part of the harbor; they lie in a southwesterly direction from Ronciglio Breakwater Lighthouse, the outer being $\frac{1}{2}$ mile distant from it. They are for the use of the Italian mail steamers.

Pilots.—There are seven pilots for the port, but pilotage is not compulsory either for entering or leaving.

Anchorage.—The outer anchorage is about 500 yards southward of Colombaia Lighthouse, in 8 or 10 fathoms water, over mud and weeds. There is also good anchorage, with southwest and southerly winds, in the bay northward of the town, in depths of 7 or 8 fathoms over sand.

Directions.—Vessels from the northward bound to Trapani, after rounding the promontory of Capo San Vito, should steer about 232° for 10 miles, when Scoglio Porcelli Lighthouse will be seen, and then Isola Asenelli Beacon and Formica Lighthouse. Bring Formica Lighthouse to bear 213° just westward of the eastern end of Favignana, and steer for it, which will lead nearly midway between Scoglio Porcelli and Secca Ballata, until Palumbo Light bears 126° and is in range with Paceco Green Peak (Monte Castellazo) 413 feet above the sea, situated to the southeastward of the town of Paceco; then steer more to the southward and gradually haul in for the anchorage.

From Trapani, bound to the southward, steer about 242° for the peak of Favignana, to avoid the shoal ground extending $1\frac{1}{4}$ miles seaward northwest of Torre Nubia, until the southern point of Levanzo is open southward of Formica, bearing 270° ; then steer 212° , passing about midway between the lighthouse of Punta Marsala at

the southeastern end of Favignana, and the lightbuoy northwestward of Punto Scario.

At night, vessels from the northward, after rounding Capo San Vito should steer for Scoglio Porcelli, and when the light, flashing white, is sighted (Isola Asinelli Light, flashing red, will be sighted about the same time), keep it bearing 233° until Formica Light, occulting white, is sighted, which light should be kept bearing 216° until through the red sector of Palumbo supplementary light, when the anchorage may be steered for.

Caution.—During the tunny season the channels eastward of Scoglio Porcelli, Levanzo, and Favignana are so much obstructed by tunny nets that it is advisable to pass westward of them.

Town.—The town of Trapani (ancient Drepanum) stands on a low tongue of land curving to the north-northwestward in the form of a scythe; it contains a population of about 59,400, is well built, with regular streets, and has a cathedral, many churches, convents, nunneries, hospitals, and other public buildings, and is entirely surrounded by a wall, with bastions, ravelins, etc. A fine marina extends along in front of the southern wall.

Communication.—Steamers leave every week for Marsala, Tunis, Bizerta, Palermo, and Cagliari, and fortnightly for Pantellaria, also frequent communication with Europe; railroad communication with Marsala, and telegraphic communication with all lines. The telegraph office is open till midnight.

Coal and supplies.—About 2,000 tons of coal are usually kept in stock, coaling is carried on by baskets, and about 200 tons could be put on board in 24 hours; there are about 50 lighters, each holding 20 tons. Southeastern and northwestern winds might impede or prevent coaling.

Supplies of fresh provisions are abundant, and very good water which is conveyed into the town by an aqueduct may be obtained by means of a municipal tank boat.

Trade.—Trapani has a considerable trade, and the salinas, just to the southeastward of the town, are the most extensive of any in Sicily, the salt being of good quality and largely exported. The inhabitants carry on the coral fishery on the African coast, the cutting and polishing of coral being a branch of industry. Besides salt and coral, the exports comprise wine, macaroni, and corn flour, and imports staves, deals, planks, chemical fertilizers, charcoal, and coal.

Hospital.—The Civil Hospital has 250 beds, 50 of which are available for a fixed rate of payment.

Coast.—To the southward of Trapani the coast land is flat, and so low as to be flooded by the sea. It is formed into extensive sal-

terns, the squares being separated by raised causeways. The salt, when collected and heaped into pyramids ready for shipment, presents from seaward the appearance of a large camp, behind which the richly cultivated land gradually rises to the small towns of Xitta and Paceco, which are backed by a range of hills 721 feet above the sea.

About 2 miles southward of Trapani is Torre Nubia, 46 feet in height, square, white, and isolated, and off the low point a small, sandy islet with shoal water extending off some distance, there being only 5 fathoms at $1\frac{1}{2}$ miles northwestward of the tower. The shoal affords some protection to the anchorage of Trapani.

From Torre Nubia the low coast, with houses close to the sea, trends in a southerly direction for $4\frac{3}{4}$ miles to a point on which is Torre di San Teodoro (telegraph), painted black and white in squares, and two mills; nearly midway between is Torre Mezzo. The country is richly cultivated with olive groves and vineyards and backed by a ridge from 320 to 400 feet above the sea.

Secca del Fiume, a detached bank with $4\frac{1}{2}$ fathoms over it, lies 2 miles west-southwestward of Torre Mezzo, and the 5-fathom curve extends nearly $1\frac{1}{4}$ miles from the shore in this neighborhood.

Isola Grande.—About 600 yards southwestward of Torre di San Teodoro is Punta Tramontana, the northern extremity of a low island, named Isola Grande, which extends southward for a distance of 3.7 miles, its surface being formed into salterns; a tower stands midway between its extremities, and there are several mills; between it and the mainland is a shallow lagoon, locally known as Stagnone, in which are two smaller islands and several rocks.

From Punta Scario, the northwest extremity of Isola Grande, shallow water extends in the same direction $1\frac{1}{4}$ miles, and in rounding the point a vessel should not approach into less than 6 fathoms water. Anchorage will be found with southerly winds off the bend of the shore northward of the island, avoiding the telegraph cable which crosses to Favignana.

Lightbuoy.—On the northwestern edge of the shoal extending from Punta Scario a cylindrical lightbuoy, with black and white horizontal stripes, surmounted by a staff, has been established, exhibiting an occulting red light every five seconds, thus: Flash, $\frac{1}{2}$ second; eclipse, $4\frac{1}{2}$ seconds.

Tunny fishery.—Tunny nets are laid out during the season, March to November, from the shore about $\frac{1}{2}$ mile eastward of Punta Scario; they extend about 1.3 miles in a northwesterly direction. The outer end is marked by a pole by day and a white light by night. (See Caution, p. 61.)

Capo Lilibeo, about $5\frac{1}{2}$ miles southward of Punta Scario, is low, sloping, and foul; the shore between, being bordered by shallow water

at distances varying from 1 to $2\frac{1}{2}$ miles, should not be approached nearer than 6 or 7 fathoms.

Porto di Marsala is an artificial port about 1 mile southwestward of Capo Lilibeo.

A conspicuous mill $1\frac{1}{4}$ miles eastward of the cape is 108 feet above the sea, and along the shore immediately southward of the town are three wine establishments appearing like large barracks and conspicuous from seaward.

The port is shallow and the entrance narrow, so vessels should not enter without local assistance.

Depths.—There are depths of 12 to 15 feet a little within the entrance. Vessels drawing 14 feet can enter. The Western Mole has depths of 4 to 9 feet alongside. The Eastern Mole is not in a condition for vessels to load or discharge alongside. A 20-foot channel into the harbor is being dredged.

Moles.—The Western Mole, extending in a southwest direction from the customhouse, curves gradually round to southeast, and is about 1,150 yards in length. At 200 yards from its extremity a mole extends 607 yards in a southerly direction.

The East Mole, 1,300 yards southeastward of the commencement of the West Mole, has an easterly direction curving slightly to the northward, and is 500 yards in length, leaving an entrance between the mole heads about 200 yards in width with depths of from $1\frac{1}{4}$ to 3 fathoms.

Lights.—On the extremity of the West Mole a circular tower, 59 feet in height, exhibits, at an elevation of 65 feet above the level of the sea, a group flashing white light. It is visible in clear weather from a distance of 13 miles.

A flashing red light is erected at the head of the outer West Mole. The light is exhibited from a skeleton iron mast set in a concrete base, and is visible 5 miles.

At the end of the East Mole a flashing green light is shown from a light tower elevated 31 feet above the sea, being visible 5 miles.

(For arc of visibility, see Light List and Chart.)

Mooring buoy.—A mooring buoy lies in $4\frac{1}{2}$ fathoms about 200 yards eastward of the flashing red light on the outer West Mole.

NOTE.—Carried away in 1914.

Pilots.—Pilots are obliged, when requested, to meet vessels arriving up to 2 miles from the entrance of the port and to conduct those leaving 1 mile from the entrance, subject to weather permitting.

When the master, moving his vessel, requests the assistance of the pilot boat, this is not refused, but for such work the pilots are entitled to payment.

Town.—The town of Marsala (ancient Lilybæum), long the capital of the Carthaginian dominions in Sicily, has, like Trapani, sev-

eral churches and convents and a cathedral dedicated to St. Thomas à Becket; it is situated northward of the port, is built in a square form, and surrounded by a wall in ruins.

The population of the town and district is about 69,410.

Communication.—Steamers every week to Palermo, Trapani, Genoa, Pantellaria, Syracuse, Porto Empedocle, and Tunis, and every fortnight to Lampedusa; also steamers frequently to England and Malta. Railroad communication with Trapani, Mazzara, and Palermo; telegraphic communication with all lines. The telegraph office at the railroad station is open till midnight.

Coal and supplies.—There is no coal, patent fuel, or oil fuel, at Marsala. Meat is not very plentiful, but bread and vegetables are. Spring water may be obtained from a public fountain near the wharf.

Trade.—The principal trade is in wine, most of which is sent to Great Britain or her colonies; cheese, salt, macaroni, olive oil, cereals, and green fruit are also exported; the imports are chiefly petroleum, staves, coffee, sugar, and wood for building.

Hospital.—The civil hospital has 30 beds.

Anchorage.—There is good anchorage, except in winter months, about $\frac{3}{4}$ mile southwestward of the lighthouse on the West Mole, with the southern wine establishment (Ingham's) bearing 65° .

Punta Sibiliana.—From Marsala the coast trends southward 5 miles to Punta Sibiliana, on which is a tower. The land between is richly cultivated and the coast low, bordered with shallow water, the 5-fathom curve of soundings being, in places, nearly 1 mile off-shore.

Sicily—Southwest coast.—Punta Bushini, 1 mile southward of Punta Sibiliana, is low and surrounded by rocks, with two or three small houses on the land forming the bay on its northern side; thence to Punta della Matica, $3\frac{1}{4}$ miles southeastward, the coast is low and skirted with rocks. Punta della Matica (Capo Feto) is surrounded by shallow water, there being a depth of 4 fathoms $\frac{1}{4}$ mile from the shore, and vessels should not approach the point within a depth of 10 fathoms. In proceeding to the southward and eastward, the light at the town of Marsala should not be brought to bear westward of 3° until Capo Granitola light bears 123° .

At Punta della Matica a sandy beach extends eastward and southward, forming an inward bend, and terminating at the town of Mazzara, $3\frac{1}{2}$ miles from the point; the low shore is bordered all along by shallow water. The red sector of Mazzara Light shows over the shoal water off Punta della Matica.

Punta della Matica (Capo Feto).—Light.—An unwatched flashing white light visible 10 miles is shown 23 feet above the sea

from pole on a yellow masonry building, 19 feet in height, situated on Punta della Matica (Capo Feto).

Tunny fishery.—Tunny nets are laid out during the season, March to November, from the shore of Punta della Matica; they extend in a south-southwesterly direction for over 1 mile; the outer end is marked with a white pole by day and a white light by night. (See Caution, p. 61.)

Mazzara (ancient Emporium or Massara) is surrounded by an old wall of Saracenic construction, flanked by small square towers, and has an old castle in ruins at its southwestern angle. The domes of the churches give the town an imposing aspect from the sea, and another conspicuous object is the white statue to San Vito at the entrance to the River Salemi (Torrente Mazzaro). The population numbers about 20,000.

Porto Canale, formed by the estuary of Torrente Mazzaro, runs in about $\frac{1}{2}$ mile westward of the town; it is about 70 yards wide for the first 100 yards and then contracts to about 30 yards. The outer part is kept dredged to a depth of 9 feet, and affords shelter to small vessels, but a pilot is necessary to take a vessel in.

Lights.—A red iron framework support, 7 feet high, and situated on the small pier on the eastern side of the entrance to the Porto Canale, exhibits, at an elevation of 33 feet above the sea, a white occulting light, with red sector every 15 seconds, thus: Light, 10 seconds; eclipse, 5 seconds. It is visible in clear weather from a distance of 10 miles. (For sector and arc of visibility, see Light List and chart.)

Two fixed red electric lights mark the entrance to Porto Canale.

Beacon.—On Secca Balata, a shoal lying about 100 yards to the westward of the small pier at the entrance, is a red beacon consisting of a masonry base surmounted by an iron framework, with cylinder; it should be left on the port hand when entering.

Mooring buoy.—A black cylindrical mooring buoy lies about 600 yards southwestward of the entrance to Porto Canale.

Anchorage.—There is anchorage, in 6 to 7 fathoms, off Porto Canale, with the statue of San Vito bearing about 56° . The bottom is generally sand and weed, but the nature should be ascertained before anchoring, as there are patches of rock.

Communication.—Steamers every week to Palermo, and to Syracuse, calling at the ports on the south coast of the island. Railroad communication with Palermo and Trapani at San Nicola, about 2 miles inland; telegraphic communication with all parts. The telegraph office is open till 9 p. m.

Hospital.—There is a civil hospital with 16 beds.

Supplies of fresh provisions may be procured, and water of good quality.

Trade.—The principal exports to Great Britain and colonies are wine, cheese, and olive oil, and the imports from the same are rice and wine.

Submarine telegraph cable.—A telegraph cable to Pantellaria is landed on the northern side of the entrance to Fiume Arena, a river $1\frac{1}{2}$ miles southeastward of Mazzara; its direction is marked by two beacons.

The beacons marking the first direction of the cable are posts, each surmounted by a white framework globe, one of the globes having the letter T in black on it. There is also a board, with a notice that anchorage, etc., is prohibited near the cable.

Il Marobbio.—It is not prudent to anchor too near the town, on account of Il Marobbio, an extraordinary phenomenon, most probably deriving its name from Mare Ubbrico, or Drunken Sea, being a violent agitation of the water, occurring principally on the southern coast of Sicily, and, though generally found to happen in calm weather, is considered the certain precursor of a gale.

Il Marobbio is felt with the greatest violence at Mazzara, perhaps owing to the contour of the coast. Its approach is announced by a stillness in the atmosphere and a lurid sky; when suddenly the water rises nearly 2 feet above its usual level, and rushes into the creeks with amazing rapidity; but in a few minutes recedes with equal velocity, disturbing the mud, tearing up the seaweed, and occasioning a noisome effluvia; during its continuance the fish float helpless on the turbid surface and are easily taken.

These rapid changes generally continue from 30 minutes to upwards of 2 hours, and are succeeded by a breeze from the southward, which quickly increases to heavy gusts. This phenomenon may be occasioned by a westerly wind, blowing at some distance in the offing toward the north coast of Sicily, and a southeast wind at the same time in the channel of Malta, the meeting of which would take place between Trapani and Capo St. Marco; for the westerly wind most usually precedes, and the southeast succeeds Il Marobbio.

South coast—Capo Granitola.—At $1\frac{1}{2}$ miles from Mazzara the Fiume Arena runs into the sea, and between it and the cape is Lago Preola. Capo Granitola is a low, broad projection, and about $\frac{3}{4}$ mile to the northward of it is the old lighthouse of Sorello and a white cylindrical tower near it; the coast in this vicinity is skirted with rocks.

Light.—On Capo Granitola a white circular tower, 110 feet in height, with a dwelling attached, exhibits, at an elevation of 123 feet above the sea, a flashing white light, visible 19 miles.

Punta Atriversa, about $\frac{3}{4}$ mile to the southeastward of the cape, is low and skirted with rocks, the shallow water extending off about

1,200 yards. All the adjacent land is flat and low, can not be seen in thick weather, and should not be approached within the depth of 10 fathoms.

Current.—Off Capo Granitola and along the south coast of Sicily the current generally sets to the southeastward, increasing in strength with northwest winds; while southwest winds, which are sensibly felt during the vernal equinox, cause a strong counter current. At times, however, the currents are irregular, and no dependence can be placed on them, but their strength and direction generally depend on that of the wind.

Coast.—From Punta Atriversa a long line of beach stretches in an easterly direction for 7 miles to another point named Polusia, composed of small cliffs and about 80 feet high. Torre Tre Fontane stands close to the sea $2\frac{1}{2}$ miles from Punta Atriversa, and near it is a good stream of fresh water; upon the rising ground northeastward of Torre Tre Fontane are the towns of Campobello and Castelvetro, the latter 660 feet above the sea.

A shallow bank, close to the beach, breaks the sea and affords shelter to the fishing boats during southerly winds; the boats are hauled on the beach at night.

Selinunte.—On the plain over the cliffs, about $\frac{3}{4}$ mile eastward of Punta Polusia, are the ruins of Selynus, or Selinuntum, which, at a little distance seaward, resembles a large town; two enormous pillars, like towers, are still standing. There are also a few houses and a coast-guard station. On each side of the cliffs is a small river, the western named Modione, and the eastern Belice; they are about 2 miles apart, with a tower on the cliff near the former.

Near the coast the land is covered with dwarf palms, wild olives, and myrtles, and abounds with game, and the interior is richly cultivated with vineyards.

Porto Palo, about 3 miles eastward of the ruins of Selinunte, is formed by a small, bluff, cliffy point named Capo Scaro, has from 3 to 4 fathoms water, over muddy sand, and is much to be recommended as a port of shelter to small vessels, from northwesterly winds. The point is rocky and surrounded with shallow water; there is a village on it, and a square tower 136 feet above the sea.

Here is a large fishery for anchovies and sardines and the town of Menfi, of which Palo is the port, is 3 miles to the northeastward, connected by a broad road through a fertile grain district, and exports a large quantity of grain. Porto Palo is difficult to distinguish when making it from the southward; the tower on the point is, however, a good guide.

Communication.—The nearest railroad station is Castelvetro, on the Trapani-Palermo line; there is a good road from Porto Palo to Menfi, and thence to Castelvetro.

Telegraph station.—There is a telegraph station on Capo Scaro.

Supplies.—Fresh provisions in small quantities may be obtained; the water is good and abundant.

Coast.—From Porto Palo to Capo San Marco, a distance of 7 miles, the coast is low and sandy, and between is the Fiume Carabi. The coast between Punta Atriversa, 17 miles west-northwestward, and this cape forms a bay more than 3 miles deep, which is clear of danger; the shore may be approached to the distance of 1 mile, in depths of from 10 to 15 fathoms, over mud and sand.

Capo San Marco is an abrupt, irregular point of reddish color, with a cylindrical white tower fronted by a house on it, elevated 310 feet above the sea; it is skirted with rocks, the depths near it are irregular, and there is a patch of $4\frac{1}{2}$ fathoms about $\frac{1}{4}$ mile southward of it.

Light.—On Capo San Marco a white octagonal turret, 21 feet in height, and surmounting a dwelling, exhibits, at an elevation of 100 feet above the sea, a flashing white light, visible 15 miles. (For arc of visibility see Light List and chart.)

Sciacca.—Between Capo San Marco and Capo Bianco, about 14 miles to the southeastward, the coast forms another extensive bay similar to that northwestward of the former cape. The town of Sciacca (ancient Thermæ Selinuntiae), about 3 miles from Capo San Marco, stands on the declivity of an eminence rising from the sea, and is surrounded by an irregular wall, with bastions toward the sea, and a castle at its eastern angle.

The monastery on Monte San Calogero, elevated 1,270 feet above the sea, lies $1\frac{1}{2}$ miles northeastward of the town.

The appearance of the town from a distance, notwithstanding its large churches, convents, and magazines, is more imposing than when in close proximity. It is one of the principal ports on the south coast of Sicily for the exportation of corn, and the rock on which the town stands is, in numerous places, hollowed out into corn cellars. The long esteemed baths of Sciacca are supplied from two springs without the town to the eastward. The water issues from a white saline rock in two distinct streams, one of which is sulphurous and hot, at about 126° Fahrenheit; the other cool, at about 60° Fahrenheit, impregnated with the saline quality of the rock, and highly valued for cutaneous disorders. But the steam baths, the construction of which was ascribed in antiquity, to Dædalus, and now called the Stufe di San Calogero, are on the summit of the hill about $1\frac{1}{2}$ miles northeastward of the town, and are said to have been in use more than 3,000 years ago. The population is about 24,640.

Mole.—A mole, 320 yards in length, in a westerly direction, extends parallel to the shore in front of the town, and incloses a space from 100 to 150 yards in width, with depth of about 4 feet.

Light.—On the end of the mole, from an iron standard, 19 feet high, at an elevation of 23 feet above the sea, is exhibited an occulting green light visible 5 miles. (See Light List.)

Mooring buoy.—There is a mooring buoy about 400 yards southward of the lighthouse, in 8 fathoms water.

Anchorage.—Vessels, in summer, anchor with the Mole Light-house bearing 59° , distant about $\frac{1}{2}$ mile in 8 fathoms water, over sand, but being exposed to all winds from southeast, round south to west, it is not resorted to in winter.

Tunny fishery.—Tunny nets are laid out during the season, March to November, from the shore, about $1\frac{1}{2}$ miles westward of the molehead; they extend in a southerly direction for about $1\frac{1}{2}$ miles. The outer end of the net is marked by two small white balls surmounted by branches, by day, and by night by a boat showing two vertical lights, upper white, lower red. (See Caution, p. 61.)

Communication.—Weekly steamers to Palermo and Syracuse; the nearest railroad station is at Castelvetro, which may be reached by road through Menfi; a railroad is being constructed up this coast from Porto Empedocle to Castelvetro; telegraphic communication with all lines. The telegraph office is open till 9 p. m.

Supplies of fresh provisions are plentiful; water of medium quality may be obtained, free of charge, from two hydrants near the root of the mole. The keys are kept at the customhouse.

Hospitals.—There are two hospitals, which receive seamen for treatment.

Trade.—There is not much commerce; the exports consist principally of corn, wine, paste, oil, and salt fish.

Coast.—About 5 miles eastward of Sciacca is Torre della Verdura, which is square, with battlements, and elevated 300 feet above the sea; about 1 mile farther, and more to the southward, is a considerable stream, Fiume San Carlo della Verdura, with an outlet on the east side of Punta Stingo. The soundings are irregular for about 1 mile off, and a shallow fronts the shore upon both sides of Punta Stingo; $6\frac{1}{2}$ miles to the northward is the remarkable knob, 3,064 feet above the sea, on Monte Caltabellotta.

Capo Bianco is a white promontory, about 90 feet high, sloping from an elevation of 450 feet above the sea, with shallow water extending upon either side for more than $\frac{1}{2}$ mile from the beach. Between the cape and Sciacca the country presents an extensive undulating and well-cultivated plain, watered by several rivers, in some of which is good fishing; the largest are Magazzolo and Platani, which flow upon both sides of Monte Sara, which is dark and elevated 1,421 feet above the sea. The plain is backed by high rugged land, and there are sulphur mines situated about 2 miles inland from the cape.

Coast.—Between Capos Bianco and Rossello, a distance of 10 miles, the coast is broken by several rocky cliffs and headlands, elevated from 300 to 500 feet above the sea. Three miles from the former cape is Torre Salsa on a point, and 6 miles beyond Torre Monterosso on another point; between these is Fiume Canna.

This part of the coast is foul, as shoals, with from 6 to 18 feet water over them, extend from $\frac{1}{2}$ mile to 1 mile from the shore; $\frac{1}{2}$ mile outside Punta Salsa is a sunken rocky patch, and about the same distance from the shore, $\frac{1}{2}$ westward of Punta Caribici, are some rocks above water, and about $\frac{1}{2}$ mile southwestward of the same point is a rock with 5 feet over it. The 10-fathom curve runs at an average distance of $1\frac{1}{2}$ miles from the shore, and that of 20 fathoms at about $2\frac{3}{4}$ miles.

About 3 miles northeastward of Punta Salsa is Monte Sedita, 1,400 feet above the sea, westward of and below which is the village of Montallegro. Eastward of Fiume Canna, at about 1 mile from the coast, is the town of Siculiana (ancient Cena); it is pleasantly situated upon two hills. There are extensive sulphur mines in the neighborhood, and a loading place on the west bank of the river. Siculiana has railroad communication with Porto Empedocle.

Anchorage.—Temporary anchorage will be found at $1\frac{1}{2}$ miles from the shore in depths of from 9 to 11 fathoms, over mud, with the castle at Siculiana bearing 42°

Tunny fishery.—A tunny fishery has been established about $\frac{1}{2}$ mile eastward of Torre Salsa, extending about 1.4 miles from the shore in a south-southwestward direction. The fishery is marked in the daytime by two balls, painted white, and a bundle of palms, on the eastern side, and another ball and palms in the center of the fishery, and at night a boat will be stationed about 40 yards from the extremity of the fishery carrying two lights vertically, the upper green and the lower white. (See Caution, p. 61, and chart.)

Capo Rossello is a conspicuous head composed of brown earth cliffs, 325 feet high, with a white lighthouse and keepers' dwellings upon it; about 1 mile to the northeastward is the village of Realmonte. The cliffs upon the eastern side of the cape are nearly perpendicular, and off the points $1\frac{1}{2}$ miles from either side of it are several rocks both above and under water, extending $\frac{1}{2}$ mile out; Balata Vecchia, which lies $\frac{1}{2}$ mile southeastward of the cape, is 13 feet above the sea.

Light.—The lighthouse on Capo Rossello is a white circular tower, 28 feet in height, with dwelling attached, exhibiting, at an elevation of 325 feet above the sea, a group flashing light; it is visible 25 miles, but is obscured by the old lighthouse when within a distance of 650 yards from the shore.

Coast.—From Capo Rossello to Punta Bianca, a distance of 12 miles in a southeasterly direction, the cliffs are of various heights around the several bays, as far as Porto Empedocle, which is 4 miles to the eastward; hence to Punta Bianca the coast is divided into three equal portions, by the Fiume Agregas and Fiume Naro, with sloping banks varying in height from 150 to 180 feet above the sea.

Within, the land rises in irregular contours to an elevation of upward of 1,700 feet, at a distance of 5 miles from the coast, having the appearance of three ranges forming a semiamphitheater, the slopes being broken by the rivers and watercourses.

Depths offshore.—The shore generally, to the distance of $\frac{1}{2}$ mile, is bordered by ledges having on them from 6 to 18 feet water. Beyond this, the soundings are irregular, the 20-fathom curve running about 4 miles from the beach, but including some detached rocks.

Porto Empedocle, the port of Girgenti, is formed by two breakwaters inclosing the new port and by an inner mole, inside which is the old port.

The Western Breakwater extends from the shore about 300 yards westward of the old mole, for a distance of about 1,080 yards in a southerly direction.

The Eastern Breakwater, commencing at about the same distance eastward of the old mole has a length of about 1,500 yards, and commencing in a south-southeasterly direction curves round to south-westward and westward. The entrance between the breakwater heads is 240 yards in width.

The old mole, inside, and forming the old port, has a southeasterly direction for about 300 yards, and then turns to the eastward for about 80 yards.

Depths.—The depth in the new port, except for a short distance southward of the old mole, where it is shoaler, is from 18 to 23 feet. Vessels drawing 21 feet can enter.

Lights.—About 20 yards from the extremity of the East Breakwater, an iron standard on a small red masonry house, 16 feet in height, exhibits, at an elevation of 27 feet above the sea, a flashing green light, which is visible 4 miles, but only faintly visible inside the port. A flashing red light is shown from a small masonry house erected a few yards from the head of the West Breakwater is visible 4 miles.

An occulting white light is shown at an elevation of 56 feet above the sea, from a small white truncated cone tower, 36 feet in height, on the head of the old mole, and is visible 10 miles.

Buoy.—A mooring buoy lies in $3\frac{1}{4}$ fathoms near the center of the new port.

Pilots.—The regulations of pilotage are the same as at Licata.

Anchorage.—The anchorage, about 1,200 yards 152° from the Western Breakwater head, is in 6 or 7 fathoms water, over sand, or sand and mud; or closer in, in a depth of 4½ fathoms, about 400 yards southward of the Eastern Breakwater; vessels, unable to go inside the mole, load in fine weather with moderate expedition, but at times it is tedious and dangerous. These anchorages are not safe in the fall of the year when southwest gales occur.

Directions.—See page 523.

Tides.—It is high water, full and change, at Porto Empedocle, at about 3 hours 50 minutes. The rise is from 3 to 9 inches, but the tide is irregular, especially at neaps. The currents along shore run according to the direction and force of the wind, attaining a maximum rate of about 1 mile an hour.

Town.—La Marina, with extensive sulphur stores, extends along the shore, and the railroad station is at the eastern end. Rising above some cultivated ground 1½ miles to the northward is Monte Monserrato, 1,040 feet above the sea, below which is the cemetery. Sulphur abounds in the hills in the eastern vicinity. The population of La Marina in 1912 was 11,174.

Communication.—Steamers every week to Syracuse and Palermo, call at intermediate ports on the south coast; also steamers to most European and North American ports monthly. Railroad communication with Girgenti, thence to Termini, on the north coast, joining the main line between Palermo and Messina; or to the eastward to Catania or Licata via Caniculla Junction; there is a line also to Siculiana, and it is to be continued to Castelvetro: telegraphic communication with all lines; the telegraph office is open till midnight.

Coal and supplies.—Porto Empedocle is not a coaling station, the coal being imported for railroad and mining purposes only.

Supplies of fresh meat, vegetable, and bread may be procured, but are not plentiful: water, but only fit for boilers and washing purposes, may be obtained near the root of the West Mole.

Trade.—The principal trade is the export of sulphur; the other exports are rock salt, almonds, wheat, and beans. The imports are coal and artificial manure.

Girgenti (Gergent of the Arabs), with a population of 26,814, stands on the side of a hill about 1,000 feet above the sea and about 2½ miles to the northeastward of the port. It is irregularly built, most of the streets being narrow, with numerous churches and convents; a cathedral (a large heavy structure) crowns the whole, giving it an imposing aspect from seaward.

The high rocky mount (1,152 feet) eastward of the town named Rupe Atenea, is the site of the Temple of Minerva, and below it, toward the sea, is that of the ancient Agrigentum, renowned for

power and commercial enterprise, and which contained a population of about 300,000.

The space which it occupied is now richly cultivated with vineyards and olive trees, and ruins of city walls, temples, tombs, and other vestiges are scattered over the entire site. Among the ruins of this once famous locality is a very perfect specimen of early Greek architecture, named the Temple of Concord.

Hospitals.—There are two hospitals at Girgenti.

Fiume Agragas.—Punta Girgenti is situated $2\frac{1}{2}$ miles southeastward of the port, and here the Fiume Agragas runs into the sea; it winds in for about 2 miles northward, then divides, one branch coming from the eastward between the sites of Agrigentum and a Roman camp, the other from the northwestward, through the valley of San Leonardo, between Girgenti and Monte Monserrato. A short distance within the shore, on right bank of the river, is Torre San Giuseppe, elevated 180 feet, and 1 mile eastward, the ruined tower of Abbate, 153 feet above the sea.

La Secca (Melville Shoal), irregular and rocky, is rather more than 2 miles in length in a northwestern and southeastern direction inside the 10-fathom curve, and about 1,200 to 1,400 yards in breadth, with depths varying from 3 to 8 fathoms. It lies $2\frac{3}{4}$ miles from the shore, and from the depth of 3 fathoms, near the central part of the shoal, Porto Empedocle western breakwater lighthouse bears 337° , distant 3.7 miles; the southern patch of 3 fathoms lies 148° , distant 1,600 yards from the preceding similar depth.

Clearing marks.—Torre Monterosso, open southward of Capo Rossello, bearing 315° , leads southward of the shoal. Torre Montechiaro (over the coast 2 miles eastward of Punta Bianca) in range with the hill over Punta Bianca, bearing 113° , leads $\frac{1}{2}$ mile to the northward of the shoal.

Monte Montserrato in range with Porto Empedocle eastern breakwater lighthouse, bearing 5° , leads to the westward.

Fiume Naro.—The mouth of the Fiume Naro is 3 miles beyond that of Agragas; it trends in a northeasterly direction for 1 mile, there uniting with the Boraidote, which flows to the southward, and the former to the northward of a ridge (9 miles from the sea), on which is the town of Naro, 1,950 feet above the sea.

Scoglio Bottazza (Peril Rock) is a small pinnacle, with one fathom water over it, and depths of from 5 to 7 fathoms close around it. It lies 1,400 yards southwestward of the entrance to Fiume Naro.

Punta Bianca is remarkable on account of its color; the beach northwestward of it is backed by earth cliffs of considerable height, which diminish toward the mouth of the Naro, distant 3 miles. A mile to the eastward of the point is Monte Grande, 870 feet above the sea, and at 3 miles in the same direction is a conspicuous tree on the fall of Monte Narbona.

A conspicuous square two-storied house, painted white, stands near the extremity of Punta Bianca and forms a good mark for distinguishing the point.

Scoglio Patella.—A few rocks lie off Punta Bianca, and 800 yards southwestward of its extremity is Scoglio Patella, 8 feet high. The rock is steep-to on its southern and eastern sides, but its north-western side should have a berth of at least 200 yards. The passage between it and Punta Bianca is not recommended, but the deepest water is nearer the rock.

Offshore soundings.—The 100-fathom curve extends from 8 to 10 miles off this coast, but there are several banks beyond this limit, with as little as 30 fathoms over them.

Directions.—Approaching Porto Empedocle from the eastward, give Scoglio Patella a berth of $\frac{3}{4}$ mile, steering 316° , which will lead in not less than 8 fathoms water nearly the same distance outside Scoglio Bottazza (Peril Rock), and nearly midway between La Secca and the shore, observing the clearing mark for that shoal.

From the southward, bring Monte Montserrat between the break-water lighthouses, bearing 5° , and steer for it, westward of La Secca. From the westward, give the shore between Capo Rossello and Porto Empedocle a berth of 1 mile, and anchor off the mole as before directed.

At night, when Scoglio Patella can not be seen, bring Porto Empedocle Old Mole occultating white light to bear 323° , and steer for it, which will lead nearly midway between La Secca and Scoglio Bottazza.

Coast.—About 2 miles to the southeastward of Punta Bianca is Punta Montechiaro, over which on the summit of a hill, 440 feet above the sea, is a square castle, Torre di Montechiaro; the shore is rocky, and the sea in bad weather breaks some distance off. Two miles beyond this the Fiume Palma, flowing with several branches from the highland above, enters the sea.

Eastward of the entrance is Torre San Carlo, and in the bay to the westward La Marina di Palma, with some small houses.

Castellazzo di Palma, about 3 miles eastward of Fiume Palma, is a small tower in ruins, 920 feet above the sea, but it is not conspicuous, as it is the same color as the land.

Palma.—The town of Palma is situated at the head of a lovely valley, about 2 miles northeastward of La Marina, the Gallia Hills rising close over it to the height of 1,400 feet. It has a trade in almonds, wine, dried fruits, and sulphur.

Anchorage.—Off Marina di Palma there is temporary anchorage in depths of from 5 to 8 fathoms, over good holding ground, but much exposed.

Rocca San Nicola is a conspicuous islet, close to the coast, about 11 miles southeastward of Punta Bianca; Torre San Nicola lies about $\frac{1}{2}$ mile eastward of the islet, and Torre Gaffi 2 miles westward. About midway between Rocca San Nicola and Torre Gaffi is Pisciotta Spring, where a conspicuous windmill pumps the water to Licata Railroad Station; 300 or 400 yards eastward of the spring is some more water of very inferior quality; this is the so-called water of Pisciotta, which is obtainable from boats at Licata.

Rocca Mudda Fedda, about 1 mile eastward of Rocca San Nicola, is an enormous rock joined to the mainland by a sandy isthmus. To the eastward of the rock is a small inlet suitable for sheltering fishing boats. The coast hence to Licata, 3 miles east-southeastward, is rocky and backed by a ridge of hills 500 feet above the sea.

Licata.—About 15 miles to the southeastward of Punta Bianca, on the western side of the mouth of the Fiume Salso, is the town of Licata (ancient Phintia), standing on the beach and slope of the hills; it is defended by Castel San Angelo, painted in black and white checkers, upon an elevation westward of the town, 479 feet above the sea; Castel San Giacomo in ruins lies on a rocky projection over the town. The town contains several churches and convents and has a population of about 23,000.

Port.—The shore fronting the town is rocky, the depths gradually deepening to 5 fathoms at $\frac{1}{2}$ mile off. The West Mole extends in a southerly direction from the western part of the town for a distance of about 350 yards, and about 50 yards from its commencement a spur about 120 yards long extends to the eastward.

The East Mole projects, from the shore under Castel San Giacomo, in a southerly direction for about 430 yards, with a western bend of 400 yards, leaving between its extremity and that of the West Mole, an entrance about 350 yards in width.

Seaward of the two moles a detached breakwater, 800 yards long and having a curved shape, has been constructed. This breakwater has a passage about 300 yards wide between its eastern extremity and that of the East Mole, and about 200 yards between the western extremity and West Molehead.

The lights on the heads of the moles are obscured over the detached breakwater.

Depths.—There are depths of 14 to 18 feet alongside the eastern mole; and 12 to 15 feet alongside the western mole, and between the breakwater and the entrance of the harbor the depths vary from $2\frac{1}{2}$ to $5\frac{1}{2}$ fathoms, but from 30 to 40 yards from the breakwater the water shoals rapidly to 2 or 3 feet. The harbor is much subject to silt from the Fiume Salso during the floods of spring. A space about 200 yards square immediately inside the East Molehead has been dredged to a depth of 18 feet. Dredgers are at work in the port.

Lights.—On the inner end of the breakwater, near Castel San Giacomo, a white conical tower, 115 feet in height, on a dark square building, exhibits, at an elevation of 131 feet above the sea, a flashing white light, visible 18 miles. (For arc of visibility see Light List.)

An occulting green light is exhibited, at an elevation of 28 feet above the sea, from an iron standard on the East Molehead, and is visible 4 miles. (For arc of visibility see Light List and chart.)

A similar standard to the preceding, and situated on the West Molehead, exhibits a flashing red light, which is visible 5 miles. (For arc of visibility see Light List and chart.)

Signal station—Semaphore.—On Castel San Angelo there is a semaphore, with which vessels can communicate.

Beacons.—A black masonry beacon, in the form of a truncated pyramid, 34 feet in height and surmounted by a black sphere, stands inside the extremities of each mole. The position of the western mole beacon is doubtful, and the western entrance is dangerous (1912).

A rock on the northern side of the harbor is marked by a masonry beacon, 8 feet in height, in the form of a truncated cone, and surmounted by a black staff and ball.

Caution.—The detached breakwater has been completed, and vessels should not enter the port after dusk without the aid of a pilot.

Pilots will board vessels about 2 miles eastward or westward of the entrances.

Communication.—Weekly steamers to Syracuse and Palermo, and frequently to Malta; railroad communication with Syracuse, Girgenti, and Palermo; telegraphic communication with all lines. Telegraph office is open till midnight.

Coal and supplies.—About 5,000 tons of coal are kept in stock, and 2,000 tons could be put on board in 24 hours by all firms; the coal is shipped in baskets and put into native craft, of which there are 30, holding about 4 to 5 tons each. Sirocco winds may prevent or impede coaling.

Supplies of fresh provisions are plentiful, water is good and brought off in wooden casks in lighters on application to harbor master. (See p. 524 for caution as to Pisciotta spring water.)

Trade.—Sulphur is the principal export; the other exports are asphalt, beans, and almonds; the imports are coal, timber, phosphates, petroleum, and grain.

Anchorage.—There is temporary anchorage about $1\frac{1}{2}$ miles south-westward of the town in 10 fathoms of water over sand, but it is much exposed.

Fiume Salso, separating the Provinces of Girgenti and Caltanissetta winds through the extensive plain of Licata, which is inclosed by a ridge 4 miles from the coast, elevated from 1,000 to 1,500 feet above the sea. The entrance, about $\frac{1}{2}$ mile northward of Castel San

Giacomo, is over a shallow bar about $\frac{1}{2}$ mile in extent, on which the surf beats heavily with southerly winds, and several rocks fringe the western shore; boats can enter the river, but the passage is narrow and intricate.

Coast.—Between Licata and Capo Scalambri, a distance of 33 miles, the coast forms a bay, the coast being in general low, with long sandy beaches. There are some isolated ridges of from 150 to 400 feet above the sea near the coast, beyond which are extensive plains backed by hills of from 2,000 to 3,000 feet above the sea at a distance of 15 miles inland. There are several streams running into the bay, the two principal of which are the Maroglio, near the center, and the Durillo, eastward of it.

Patches of rocks lie off the shore in several places and together with the shallow frontage of 6 and 18 feet do not, however, extend more than $\frac{1}{2}$ mile. On the western side of the bay banks of 5 fathoms extend for a distance of $1\frac{1}{2}$ miles, and a depth of 20 fathoms is obtained at about 5 miles off, the bottom being chiefly of mud and sand.

Two Rocks Point, Punta due Rocche, lies $4\frac{1}{2}$ miles eastward of Licata, and 1 mile farther is Punta Falconara, upon which is a tower. These points are fronted by rocks and shallows for a distance of 600 yards; Monte Desusino, 1,407 feet above the sea, rises $2\frac{1}{2}$ miles from the coast. The coast, partly of low cliffs, continues to the eastward for 4 miles to Torre di Manfria, a square gray tower on a rocky headland, the hills close over it being 407 feet above the sea.

Shoals with a depth of 5 fathoms lie off this part of the coast for a distance of $1\frac{1}{2}$ miles, and there are several patches of rock along the shore to the eastward. Capo Soprano, 4 miles east-southeastward of Torre di Manfria, is the next conspicuous head, and on its elevated ground to the eastward is the town of Terranova.

Terranova.—The town of Terranova (ancient Gela) stands on a hill; it has a fine palace and a good hospital, but the streets are irregular and dirty; its castle, churches, and convents appear to be neglected, and the whole town suffers much from a scarcity of water. The population is about 22,000; there is a trade in sulphur, corn, wine, and a coarse cloth which is manufactured in the town.

The Fiume Maroglio is joined by the Dissueri at 2 miles from the coast, and flows through richly cultivated plains from the high land northeastward, entering the sea on the eastern side of the town.

Landing mole.—A landing mole is being constructed at Terranova of reinforced concrete, and was nearly completed in August, 1915; it extends about 200 yards from the land.

Light.—A small white square building, situated on the beach, near the landing places, exhibits, at an elevation of 16 feet above the

sea, an occulting white light; it is visible 9 miles. (For arc of visibility see Light List.)

Anchorage.—The anchorage, about $1\frac{1}{2}$ miles from the shore, in 6 fathoms water, over sand and mud, is much exposed; southwest winds sends in a heavy sea, and vessels should be ready to leave at any moment. Small vessels lie at the western end of the Caricatore (shipping place), under the Torre dell' Insegna, which stands on the high land over Capo Soprano, off which, however, are some rocks.

Communication.—Weekly communication by steamer with Palermo and Syracuse and intermediate ports, and frequently with Malta. By railroad with Licata and Syracuse, and telegraphic communication with all lines. The telegraph office is open till 9 p. m.

Coal and supplies.—There is no coal. Supplies of fresh provisions are not plentiful, and water is scarce and not good.

Hospital.—There is only one hospital, for civil and military.

Caltagirone.—About 17 miles northeastward from Terranova is Caltagirone (Hibla Minor), considered the best mountain town of the island; it has manufactories of pottery and calico and carries on an active trade in wines, oil, etc.

Coast.—About 7 miles to the southeastward of Capo Soprano the Fiume Durillo (the ancient Achates) enters the sea, and a white house stands within the sandy beach a little to the westward of its entrance; at the foot of the hills, 1 mile to the northward, is Lago Biveri or Lentini. Punta Safaglione, situated 6 miles in a south-southeasterly direction, is rocky and fronted by rocks extending about $\frac{1}{4}$ mile from the shore.

Scoglitti, a village with a population of about 1,400, and situated 2 miles southward of Punta Safaglione, has a considerable trade in wine, and may be known by various storehouses or magazines standing on the side of a small rocky bay which opens to the westward; the strong winds prevalent from this quarter in winter cause much damage.

Light.—From a circular white house, 33 feet in height, at Scoglitti, is exhibited, at an elevation of 46 feet above the sea, a flashing white light, which is visible 8 miles. (For arc of visibility see Light List.)

Buoy.—There is a small cylindrical iron buoy in the roadstead, off Scoglitti, for the use of mail steamers.

Life-saving station.—A rocket apparatus is maintained at Scoglitti.

Communication.—Steamers between Palermo and Syracuse call weekly, and there is a railroad station at Vittoria, distant 8 miles, on the line to Syracuse; telegraphic communication with all parts.

Supplies.—Fresh provisions are scarce, but there is an abundant supply of water from a public fountain.

Coast.—To the southward of Scoglitti is another small bay on the southern side of which is Punta Camerina and the site of ancient Camarina. At the head of the bay Fiume Ipari (the ancient Hipparis) flows into the sea through a marsh; it passes to the eastward of the town of Vittoria, situated $6\frac{1}{2}$ miles to the northeastward, and elevated 548 feet above the sea, which town has a population of about 32,000 and a trade in honey and silk.

Punta Bracetto and tower is $3\frac{3}{4}$ miles farther to the southward, and at a distance of $2\frac{1}{4}$ miles south-southeastward is Capo Scalambri, with Punta Pietro and a low, ruined tower about midway. The shore between Scoglitti and the cape is bordered by shallow water, and $1\frac{1}{2}$ miles southward of Punta Camerina, rocks awash extend $\frac{1}{2}$ mile from the shore; vessels should give it a wide berth in passing, keeping the lead going.

Capo Scalambri (Scaramia), ancient Bucra Prom., is a low rocky point, and off it are some islets or rocks; a reef projects from the shore both east and west, so that caution is necessary when nearing it. During bad weather and westerly winds allowance should be made for the current, and the cape should not be approached too closely.

On the eastern side of the cape is the little port of Secca (ancient Caucana), protected by a natural breakwater of rocks, and on the slope of the hill 3 miles northeastward Santa Croce Camerina village is situated, 328 feet above the sea. There is a coral fishery off the cape.

Light.—On Punta Secca, the southeastern extremity of Capo Scalambri, a fixed white light is exhibited, at an elevation of 124 feet above the sea, from a white circular tower, 113 feet in height, and surmounting a dwelling, and is visible 17 miles.

Mazzarelle.—Three miles eastward of Capo Scalambri is Il Caricatore di Mazzarelle, with a large tower and several storehouses. There is a considerable trade between here and Malta.

Light.—From an iron candelabrum on the coast at Mazzarelle is exhibited a fixed red light, visible 3 miles.

Coast.—About 8 miles southeastward of Mazzarelle a broad and elevated headland terminates in Punta Corvo, which is rocky, and several streams run into the intervening bay, which is partly of sand; some houses known as Donna Lucata lie on the coast, 4 miles from Mazzarelle.

The town of Scicli (ancient Casmene), $4\frac{1}{2}$ miles northward of Punta Corvo, has several churches, and a population of 16,200; it is 692 feet above the sea, with a stream flowing past its western slope.

Modica (ancient Motyca), 5 miles farther, in the same direction, but on the opposite side of the stream, is a town with an export trade of grain, oil, wine, etc. Near to it is the Valley of Ipsica, famed for its dwellings excavated in the rock. The railroad between Terranova and Syracuse passes near Sicieli and Modica.

Punta Religione (Regiglione), sandy, and showing bright yellow on the eastern side, is $3\frac{1}{2}$ miles east-southeastward from Punta Corvo, with several small sandy bays lying between, fronting some lagoons; upon a central slope is a tower, and on a point a little to the westward is the village and cove of Sampieri, or San Pieri.

Pozzallo.—Between Punta Religione and Punta Grotta, $8\frac{1}{2}$ miles to the eastward, is a bay $2\frac{1}{2}$ miles deep, on the western side of which, $3\frac{1}{2}$ miles from Punta Religione, is the town of Pozzallo, the principal Caricatori of Modica. It has a palace, churches, several magazines, and a population of about 6,590.

Light.—From a gray iron framework support, in front of a small white masonry house, erected on the landing place at Pozzallo, is exhibited, at an elevation of 33 feet above the sea, an occulting white light. It is visible 11 miles. (For arc of visibility see Light List and chart.)

Anchorage.—Summer anchorage in depths of from 7 to 12 fathoms, over sandy bottom, may be obtained 900 yards off a small pier.

Communication.—Steamers every week to Palermo and Syracuse, calling at the intermediate ports, also frequently to Malta; railroad communication with Terranova and Syracuse, and telegraphic communication with all lines. The telegraph office is open till 9 p. m.

Supplies.—Moderate supplies of fresh provisions may be procured; the water is not very good.

Spaccaforno, a walled town on a hill 5 miles northeastward of Pozzallo, has numerous churches, convents, and public buildings.

Coast.—La Favara, which flows from the northward past the town of Spaccaforno, enters the sea by two mouths $2\frac{1}{2}$ miles eastward of Pozzallo, and from this a beach curves for $3\frac{1}{2}$ miles in a southeastern direction toward Punta Grotta, the country within being low and marshy; there are some ancient and other ruins along the shores of the bay.

Punta Grotta (Marza) has reefs extending in two points to the southward; Scoglio Jannuzzo, a small rock above water, 800 yards from the coast, marks the eastern extremity, and Secchi Circia, with depths of 2 fathoms and $4\frac{1}{2}$ fathoms, lying respectively, $\frac{3}{4}$ mile westward and $\frac{1}{2}$ mile southwestward of Jannuzzo, lies on the western extremity.

Scogli Porri, a group of flat rocks, 17 feet above the sea, lies about $1\frac{1}{2}$ miles westward of Punta Grotta, with from 8 to 10 fathoms

water between them and Secchi Circia; various birds frequent the rocks for a species of wild leek growing on them.

Light.—On the highest rock of Scogli Porri, from a masonry tower, is exhibited, at an elevation of 34 feet above the sea, an unwatched occulting red light; it is visible 8 miles.

Outlying shoals.—A rocky shoal, with 4 fathoms water on it, lies 1,400 yards southwestward of Porri Lighthouse; another with $5\frac{1}{2}$ fathoms lies 1,400 yards southward of the lighthouse; another with 9 fathoms, 1.7 miles in the same direction; and nearly midway between these two latter is one with 7 fathoms over it.

Baia della Marza (Porto Ulisse), between Punta Grotta and Isola della Correnti, $6\frac{1}{2}$ miles southeastward, is 2 miles deep, with shores broken by rocky points and sandy beaches. The depths are irregular, but a depth of 10 fathoms will be found in the center of the bay over a sandy bottom. There is a castle on a point $1\frac{1}{4}$ miles from Punta Grotta, and eastward of the castle, charcoal and wood are embarked; the village of Marza stands about $\frac{1}{2}$ mile northward of the castle, and near the center of the bay a spring of fresh water rises near the beach. At the back of the beach is a salt marsh.

Punta delle Formiche is a low white cliff about $1\frac{1}{2}$ miles to the northwestward of Correnti, the shore between forming a bight with a beach broken by rocky points. Off Punta Formiche there are five black rocks appearing just above the water, and southward of it a reef extends for a distance of 700 yards.

Within the bight, between Punta Formiche and Isola Correnti is a small cove formed by picturesque white cliffs, where are the remains of some ancient sepulchers, in a kind of rubblework. The neighborhood is low, marshy, with several lagoons, and overrun in many parts with a luxuriant profusion of heaths, myrtles, fan-palms, capers, and junipers, in which numbers of singular reptiles and insects abound.

Reef.—A detached patch, with 12 feet water over it, lies nearly 1 mile to the southward of Punta Formiche.

Isola delle Correnti, a small sandstone island joined to the southern extremity of Sicily by a causeway, has on its northeastern side a natural mole, where the Maltese trading boats at times seek shelter.

Light.—On the southern point of the island is a square flat-roofed yellow house, surmounted by a polygonal tower painted in black and white horizontal bands, 30 feet in height, the lantern of which is a little higher than the top of the house. The tower exhibits, at an elevation of 55 feet above sea, a fixed white light, which is visible 9 miles. (For arc of visibility, see Light List.)

Shoals.—Shallow water extends some distance southward of the islet, and a bank with 16 feet water over it, lies $\frac{1}{2}$ mile to the south-

ward of the lighthouse, from which also two patches, with depths of 9 and 10 fathoms over them, lie 130° and 90° respectively, distant 1 mile.

A rocky knoll, with 9 fathoms water over it, lies with Correnti Lighthouse bearing 64° , distant $3\frac{1}{4}$ miles, and a similar patch is situated $\frac{1}{4}$ mile northwestward of the preceding.

In 1905 an Italian steamer reported striking a bank 4 miles southward of Correnti Lighthouse, but its existence is doubtful and is shown as an obstruction only on the chart.

Coast.—From Isola Correnti the coast of Sicily trends about in a northeasterly direction for 3 miles to a small bay named Porto Palo, where there is anchorage for vessels of light draft in all winds but those from the southward. Round the shores of the bay, which are low and marshy, there are some rocks, and in the center of the entrance is a shoal with a depth of 12 feet over it; 7 fathoms outside and 4 fathoms in the passage on each side; within the bay there are from 2 to $3\frac{1}{4}$ fathoms water, over sand and mud. The eastern point is low and rocky and trends in a northeasterly direction for 2 miles to Capo Passaro, the ancient Pachynus.

Capo Passaro (Passero).—Isola di Capo Passaro is about $1\frac{1}{2}$ miles in extent, with a tower redoubt on the cape or eastern point. The islet is arid, being composed of a singular accumulation of marble, lava, tufa, cinders, and oceanic deposits and is high on all sides except the westward, where it is connected to the mainland by a sandy neck with 2 feet water over it.

On the point westward of the islet is the village of Porto Palo and over it a conical hill named Cozzo Spadaro. The southeastern projection of Sicily, for a distance of 10 miles inland, is composed of small hummocks, with a great deal of marsh land and numerous lagoons near the shore. The population is sparse.

Lights.—A white circular tower, 17 feet in height, above the northeastern corner of a yellow fort and 63 feet from the ground on Isola di Capo Passaro, exhibits, at an elevation of 127 feet above the sea, a group flashing white light, visible 14 miles. (For arc of visibility, see Light List.)

On the summit of Colle Cozzo Spadaro and nearly 1 mile westward of the fort on Isola di Capo Passaro is a white octagonal tower, 120 feet in height and having a square base, which exhibits, at an elevation of 270 feet above the sea, a fixed and flashing white light, visible 24 miles. (For arc of visibility see Light List and chart.)

Signal station—Storm signals.—At Cozzo Spadaro Lighthouse there is a semaphore and telegraph station. Storm signals are shown here.

Tunny fishery.—Tunny nets are laid out during the season, March to November, from the shore on the northern side of Isola di Capo Passaro; they extend in an easterly direction for about 1 mile and in a northeasterly direction for about $\frac{3}{4}$ mile. The outer ends are marked with a floating beacon surmounted by a white pole by day and a white light at night. (See Caution, p. 61.)

Tides.—At Capo Passaro and Isola Correnti it is high water at full and change, at about 3h. 0m.; the greatest rise is 11 inches, but the tides are irregular, being influenced by the direction and force of the winds.

CHAPTER VIII.

THE EAST COAST OF SICILY, THE LIPARI OR ÆOLIAN ISLANDS, AND THE NORTH COAST OF SICILY.

EAST COAST OF SICILY.

Coast.—Between Capo Passaro and Capo Murro di Porco, a distance of 21 miles, the coast recedes, forming a large bay about 6 miles deep; the shores are in general very irregular and rocky, bordered by islets and shoal patches, all, however, lying within 1 mile of the shore; the northern part of the indentation is the deepest.

There are several streams and watercourses, and at about the center of the above bay are the towns of Avola and Noto, behind which the mountain ridges slope from elevations of 2,000 feet above the sea at a distance of 10 miles from the coast.

Capo Marzamemi, $3\frac{1}{2}$ miles northward of Capo Passaro, is a broad projecting point on which is the village of the same name. On a hill to the southwestward of the village is the town of Pachino, 207 feet above the sea, the church of which, with the windmill near it, are conspicuous from seaward. The embayed coast from Passaro to Marzamemi is barren and desolate; the latter part is fronted by two small islets skirted with rocks and shallow water, and midway is an extensive salt lake.

Breakwater.—A breakwater has been constructed; it commences on the mainland, to the southward of Isola Grande, and extends in a 39° direction toward that island.

Light.—An occulting red light is shown, 30 feet above the sea, from an iron framework column on the head of the breakwater, visible 4 miles.

Communication.—Steamers between Palermo and Syracuse call weekly, and there is telegraphic communication during limited hours. The nearest railroad station is at Rosolini, 9 miles distant.

Tunny fishery.—Tunny nets are laid out during the season, March to November, from the shore near Marzamemi; they extend nearly 1 mile in an easterly direction, and the outer end is marked with a floating beacon, surmounted by a white pole by day and with a white light by night. (See Caution, p. 61.)

Anchorage.—There is good anchorage with westerly winds in the bay between Capo Passaro and Marzamemi, in from 9 to 10 fathoms water, about $1\frac{1}{2}$ miles northward of the cape.

Depths offshore.—Off the coast between Correnti and Marzamemi 10 fathoms will be found within 1 mile of the shore, the bottom being generally mud. About 30 miles eastward of Capo Passaro there are some coral patches of 40 fathoms, but depths of from 1,000 to 2,000 fathoms have been obtained in their vicinity.

Isolotto Vendicari, 3 miles northward of Marzamemi, is low, small, rocky, and nearly connected to the main island by a sandy spit; the coast between is broken into small sandy bays, and opposite the islet are two salt lagoons; a tower stands on a rise beyond the southern lagoon, and another on the shore $\frac{1}{2}$ mile northward of the islet. A sunken rock lies about 400 yards to the southeastward of Vendicari.

Depths offshore.—Between Marzamemi and Isolotto Vendicari the bottom is very irregular, there being depths of 3 and 5 fathoms at 1 mile off. Shoal water extends $\frac{3}{4}$ mile northward of Capo Marzamemi; the outer edge, with a depth of 2 fathoms, is $\frac{3}{4}$ mile from the adjacent shore.

Tunny fishery.—A tunny fishery has been established on the shore about $1\frac{1}{2}$ miles northward of Isolotto Vendicari. The nets extend in a direction varying from northeast to east-southeastward for a distance of about $1\frac{1}{2}$ miles; the outer end will be marked by a floating mast with a red flag by day and a white light at night.

Punta Bernarda, nearly 5 miles northward of Isolotto Vendicari, is a projection of the coast, which is skirted by rocks; upon it are several houses named La Ballata, or Marina di Noto, connected with the town of Noto by a broad road $3\frac{1}{2}$ miles long. Halfway between Vendicari and La Ballata is the Fiume Tellaro di Noto; there are also other streams and a salt lake. Two miles to the northward of Ballata are a beach, jetty, and La Marina di Avola, consisting of several houses, distant $\frac{1}{2}$ mile by road from Avola.

Noto, near the site of the ancient Neetum, containing a population of about 22,200, is conspicuous from seaward, stands on a hill 521 feet above the sea, $3\frac{1}{2}$ miles west-northwestward of Punta Bernarda, and has a good road leading to the town of Avola, with which it is also connected by the railroad to Syracuse. Noto has large squares, regular streets, a cathedral, several churches, and convents, and is one of the best-built and most agreeable towns of Sicily. Its trade is wine, oil, and sulphur.

The ruins of an amphitheater and of a gymnasium are the principal remains of the ancient city, which stood about 4 miles northwestward of the modern town and was destroyed by an earthquake

in 1693. The Fiume Noto winds through the plain below and disembogues northward of Punta Bernarda.

Avola, a town about $2\frac{1}{2}$ miles northward of Punta Bernarda, is prettily and salubriously situated on a wooded eminence. It has several respectable edifices, tolerable streets, and a good market place, with an air of cleanliness and regularity. The population is about 11,000, and there is a traffic in wine, corn, cheese, almonds, oil, honey, and fruit. The adjacent country abounds in game and supplies pasturage to a number of cattle, many of which are exported to Malta.

Tunny fishery.—Tunny nets are laid out during the season, March to November, from the shore near the mouth of the Fiume Noto and extends $1\frac{1}{2}$ miles in an easterly direction.

The outer end is marked with a floating beacon surmounted by a white pole by day and a white light by night. (See Caution, p. 61.)

Fiume Cassibile (ancient Cacyparis) runs into the sea 5 miles northward of Punta Bernarda; 1 mile farther on is Punta del Cane and $1\frac{1}{2}$ miles back is Capo Negro. The coast between Punta Bernarda and Punta del Cane is low with several sandy coves and a few rocks; a patch lies about 400 yards offshore, a little northward of the mouth of Fiume Cassibile. Fresh water may be obtained from the Cassibile and the river abounds in trout.

Tunny fishery.—Tunny nets are laid out during the season, March to November, from the shore near Punta del Cane, and extend about 1,400 yards in an easterly direction. The outer end is marked with a floating beacon surmounted by a white pole by day and a white light by night. (See Caution, p. 61.)

Anchorage.—All along the coast, northward of Capo Passaro, a vessel may anchor in case of necessity, with westerly winds, choosing a berth by the lead. The bottom inshore is sandy, but farther off is stiff clay.

Capo Lognina is situated nearly 4 miles east-northeastward of Capo Negro, and here is Baia di Lognina, a small bay, formed by a large rock joined to the coast by a reef, on the northern side of the cape, which latter is bold, with a round tower on it.

A shallow bank projects about $\frac{1}{2}$ mile from the southern shore. Between this cape and Murro di Porco is a fine bay with sandy coves, where vessels may find shelter from northerly winds in about 13 fathoms water over a bottom of sand and mud.

Capo Murro di Porco (ancient Longnum Prom.), the southeastern extremity of Penisola della Maddalena (the ancient Plemmyrium Prom.), 9 miles east-northeastward of Capo Negro, is formed of rocky cliffs nearly perpendicular, about 50 feet above the sea, from the top of which the land rises gradually to the northwest. The

cape is clear of danger, and about 200 yards from it there are from 15 to 20 fathoms water.

Light.—Near the extremity of Capo Murro di Porco is a white tower, 59 feet in height, which exhibits, at an elevation of 110 feet above the sea, a flashing white light, visible 16 miles. (For arc of visibility see Light List.)

Capo Panagia (Santa Panagia), $6\frac{1}{2}$ miles northward of Capo Murro di Porco, is a bold headland, 217 feet above the sea, fronted by cliffs 45 feet high, on which is the ruin of a house. The cape may be approached to a distance of $\frac{1}{4}$ mile, as no danger exists off it.

Coast.—Between the two capes the coast is generally clifty, and viewed from sea, has a barren, rocky appearance, caused by the absence of trees, but it is in reality well cultivated; nearly midway between are the town and harbor of Syracuse. From Capo Murro di Porco to Syracuse the coast is steep, and may be approached to $\frac{1}{4}$ mile; thence to Capo Panagia it is less bold than to the southward, with some rocks close to the shore.

Depths offshore.—Within 1 mile of the southern, and $1\frac{1}{2}$ miles of the northern cape, there is 100 fathoms, from whence the depths rapidly increase.

Syracuse Harbor.—The harbor is a semicircular indentation in the coast about 2 miles in length north and south and 1 mile east and west, the northern part being protected by Isola Ortigia from the heavy sea caused by easterly winds. The entrance is between Castello Maniaci and Punta Castelluccio, which is clifty, and situated 1,300 yards to the southward; off the latter are some rocks and the shoals of Plemmyrium, which narrow the entrance for large vessels.

The shores of the harbor on the southern side are generally of slight elevation, being from 20 to 40 feet above the sea, with a salt lake south of Fiume Anapo; but on the northern side they are quite flat and bordered with a sandy beach, and rise gradually to an elevation of about 200 feet above the sea, to the site of the ancient Neapolis, with its aqueduct, temples, and amphitheater. Two broken columns, the only remains of the temple of Jupiter Olympus, are seen on entering the harbor, and were formerly used as a leading mark.

From a depth of 8 or 9 fathoms the water shoals gradually to the shore, the depth of 5 fathoms averaging a distance of 600 yards from the southern and western sides of the harbor and twice that distance from the northern part.

Fiume Anapo flows into the sea on the western side of the harbor, through the alluvial plain, from whose marshes Syracuse derived its name, the miasma from which so often caused the destruction of its besiegers in former days. The marsh is now only partially drained and in summer malarial fever is prevalent on the western side of the harbor, but the inhabitants of the town are not much affected by it.

About 1 mile from its mouth Fiume Anapo is joined by Fiume Ciant, and at about 2 miles is the celebrated fountain or spring of Cyane, now named El Pisma, a circular basin of the purest water, though from its muddy bottom it has a black appearance; it is about 60 or 70 feet in diameter and 26 feet deep, and well stocked with fine fish; the banks are covered with a profusion of aquatic plants. Thence it flows in a narrow, limpid, and quiet but deep stream, joining the Anapo at about $\frac{3}{4}$ mile from the sea. In the valley and between the two rivers, 6 miles northwestward of the shore, is the town of Floridia.

La Darsena is formed by the channel northwestward of the town, and is divided by a stone bridge with low arches, which connects the town with the mainland. The northern side of the bridge is only used by small boats in fine weather. On the southern side of the bridge there are depths of $2\frac{3}{4}$ fathoms, decreasing to $2\frac{1}{4}$ fathoms.

Caution.—With winds from east-northeast, east, and sometimes from southeast, in winter, a very violent current runs through La Darsena. Vessels, therefore, are very strongly recommended when these winds blow fresh, especially from east-northeast, to leave the basin and anchor outside.

Lights.—On the highest part of Castello Maniaci, on the northern side of the entrance to the harbor a circular tower, painted in black and white horizontal bands, 22 feet in height, exhibits at an elevation of 90 feet above the sea an occulting green light; it is visible 6 miles. (For arc of visibility see Light List.)

At Punta Castelluccio, on the southern side of the entrance, an occulting red light is shown, at an elevation of 69 feet above the sea, from a small turret on a building, the whole painted in red and white horizontal bands; it is visible 7 miles. (For arc of visibility see Light List.)

Two range lights are exhibited from red and white checkered beacon towers. The front light, named Caderini, is distant about 550 yards northwestward from Punta Callarine and exhibits, at an elevation of 40 feet above the sea, an occulting white light; in clear weather it is visible 10 miles. (For arc of visibility see Light List.)

The rear light, named Carrozzieri, situated 268° , distant 1,060 yards from the front light, is fixed white and shown at an elevation of 83 feet above the sea; it is visible from a distance of 12 miles. (For arc of visibility see Light List.)

These lights in range, bearing 268° , lead in the deepest water through the entrance channel to the harbor.

Two ordinary electric lamps are established on the northwestern side of the pier near the harbor office, one on each side of the landing steps. Lights are shown from the landing place at the Piazza Mazzini.

Dangers at the entrance.—Scoglio Castelluccio, lying nearly 200 yards northward of Punta Castelluccio, are readily distinguished; they are low and flat, excepting at the northeastern end, where there is a remarkable square lump. They are steep-to seaward, but there is no passage between them and the shore.

Scoglio Galera, or Egg Rock, 800 yards westward of Punta Castelluccio, is small and flat and lies 200 yards from the shore.

Plemmyrium Shoals lie on the northwestern side of Punta Castelluccio and narrow considerably the entrance of the harbor for large vessels. They consist of two rocky patches, with general depths of from $3\frac{1}{2}$ to $4\frac{1}{2}$ fathoms over them, the shoalest water, Secca Galera, being $3\frac{1}{4}$ fathoms, from which Castelluccio Lighthouse bears 117° , distant 800 yards.

Dog Rock (Scoglio del Cane), lying about 400 yards eastward of the town, is awash, and marked, except in fine weather, by heavy breakers; it is steep-to seaward but connected to the shore by rocky patches.

From Castello Maniaci, at the southern end of the town, a rocky bank stretches eastward, with irregular soundings, which should be avoided by vessels of heavy draft. The outer edge of this bank, with $4\frac{1}{4}$ fathoms water, is 650 yards eastward, from Maniaci lighthouse. The southern and western sides of the point are fringed by shoal ground, which extends 200 yards from the shore.

To avoid the bank and Scoglio del Cane (Dog Rock), when bound into Syracuse, coming from the northward, Castelluccio Lighthouse should not be brought to bear less than 195° until the mark for the harbor is in range.

Anchorage.—Vessels may anchor where convenient, in 6 to 8 fathoms of water, over stiff, muddy bottom. Vessels drawing 20 feet can go alongside the customhouse wharf, and those drawing 17 feet alongside the landing wharf.

Mooring buoys.—A mooring buoy for torpedo boats has been established near the harbor office pier; and a red cylindrical mooring buoy has been established in the northern part of the harbor off La Darsena for the use of vessels going alongside.

Directions.—In entering the harbor of Syracuse, Castelluccio Lighthouse should not be brought to bear less than 195° until the two range light towers on the western side of the bay are in range bearing 268° , or St. Josephs Bridge, which is constructed with an iron span, the ends of which rest on conspicuous stone supports built out from either bank of Fiume Anapo, is in range with Monte Grosso, bearing 281° .

The towers in range lead into the harbor, in the deepest water, between Castello Maniaci and Plemmyrium Shoals, and when Scoglio

Galera bears 167° the vessel will be inside the shoals, and may steer for the anchorage.

By night, the range lights exhibited from the beacon towers in range, bearing 268° , lead in the deepest water of the entrance channel, until Maniaci Light bears 28° , when the anchorage may be steered for.

Caution.—Mariners are warned that great care should be taken not to open the rear range light (or beacon) to the southward of the front light (or beacon), as the range line just touches the 10-fathom curve northward of Plemmyrium Shoals.

Town.—Syracuse (Siracusa, ancient *Syracusæ*) was founded by a colony from Corinth about 734 B. C., and gradually increased in prosperity until the circuit of its walls was about 22 English miles and the population is supposed to have numbered 500,000. The ancient city was of a triangular form and consisted of five towns: Ortigia, or the islet called Nasos, which was all the Greeks first occupied, after having expelled the Sicilians; Achradina, the handsomest, facing the sea, and northward of Ortigia; Tyche, named after the temple of Tyche, or fortune, and lying northwestward of Achradina; Neapolis, southward of Tyche; and Epipolæ, the town above the three latter, strongly fortified.

The modern town is wholly confined to that small portion of the site of the ancient city included in the island of Ortigia, separated from the main by a fosse, and projecting southward in the shape of a narrow peninsula, forming the eastern side of the harbor. It has little except its ancient renown, its fine harbor, and the extreme beauty of its situation to recommend it.

It has a cathedral which was formerly the temple of Minerva, several churches, with numerous convents, a college for general studies, a seminary for the clergy, a hospital, a lazaretto, extensive barracks, a museum, and a public library. The streets are narrow and dirty. The island is surrounded by a wall with bastions, and is strongly fortified at its northern end by a series of forts, and on its southern extremity by the Castello Maniaci. The population in the year 1911 was 40,587.

Communication.—There is daily communication by steamer with Malta (9 hours), and weekly with Genoa, Tripoli, Tunis, and Palermo, calling at intermediate ports; and by rail with Licata, and Palermo and Messina via Catania; the railroad station is at the northern head of the bay. Telegraphic communication with all lines. The telegraph office is open till midnight.

Submarine telegraph cable.—Two submarine cables connect Syracuse with the Tripoli coast, one to Tripoli, the other to Bengasi.

Coal.—About 3,000 tons of coal is usually kept in stock; 300 tons can be put on board in 24 hours. There are 12 lighters available, each

holding 10 tons. There is a coal wharf, 600 feet long, with a depth of 25 feet alongside.

Supplies of fresh provisions, vegetables, and fruit may be procured; turkeys are cheap and plentiful; good water may be obtained from five nozzles on the Foro Vittorio Emanuele quay near the harbor master's office; from 14 to 17 tons can be obtained per hour. Application should be made to municipal engineering office for the use of materials and as to payment. There are also three small water tank vessels, which supply water alongside. The water in the Fiume Anapo is not good.

Hospitals.—There is an infirmary with 100, and a civil hospital with 60 beds; the latter receive strangers at a fixed rate.

Trade.—The principal exports consist of lemons and oranges, asphalte rock, olive oil, tomato sauce, carobs, almonds, and cereals; and the imports of petroleum, timber, wheat, wine, and coal.

Porto Piccolo (ancient Marmoreus) is a shallow bay separating the island, on which is the town, from the mainland. It is suitable only for boats in fine weather, as the sea breaks right across it at other times, particularly in easterly gales.

Punta Spuntone, the northern extremity of the Syracuse Bay, is formed of yellowish cliffs, of no great height, and having several winding coves.

Scoglio di Grotto Santa, or perforated rock, is small, 37 feet above the sea, and lies nearly midway between Capo Panagia and the northern end of Syracuse. It is 150 yards from the shore and has a hole through its base; on it is a small black cross, which can only be seen a short distance.

Monte Fiopriolo.—About 5 miles inland of Capo Panagia a remarkable mountain range, from 1,100 to 1,500 feet above the sea, named Fiopriolo, will be seen rising from the plains of Syracuse and stretching in a northwest direction. Between the Penisola Magnisi and Augusta this range is about $2\frac{1}{2}$ miles from the coast and parallel to it, descending precipitously to about 400 feet high, and thence gradually to the sea; on the fall to the northward is the town of Melleli, with its churches, elevated 1,200 feet above the sea.

Tunny fishery.—Tunny nets are laid out during the season, March to November, from the shore 1 mile westward of Capo Panagia; they extend northeastward about 800 yards, and the outer end is marked with a floating beacon surmounted by a white pole by day and a white light by night. (See Caution, p. 61.)

Coast.—Capo Santa Croce is about $8\frac{1}{2}$ miles northward of Capo Panagia, the coast between forming two bays, which are separated by the Penisola Magnisi; the southern bay is named Panagia, and at the northern end of the northern is the town and port of Augusta.

Magnisi, the ancient peninsula of Thapsus, is about $3\frac{1}{2}$ miles northwestward of Capo Panagia, from the cliffs of which it curves northward and westward. It is a little over 1 mile in length north-northwestward and south-southeastward, less than $\frac{1}{2}$ mile in breadth, 90 feet above the sea, and connected to the main island by an isthmus or narrow neck of sand.

Light.—On the northeastern point of Penisola Magnisi an occulting white light is exhibited, at an elevation of 48 feet above the sea, from a circular tower 31 feet in height, painted in red and white horizontal bands, and with dwelling attached. It is visible 12 miles. (For arc of visibility see Light List.)

Secca Magnisi, having depths of from $3\frac{1}{2}$ to 5 fathoms over it, extends $\frac{1}{2}$ mile northeastward of the lighthouse. The southern end of Monte Fiopriolo, in range with Punta Tuano, the northwestern end of Penisola Magnisi, bearing 224° , leads westward of the spit.

Priolo.—The village of Priolo is situated about $\frac{1}{2}$ mile from the shore of the bay westward of Penisola Magnisi, and southward of Fiumara del Fico, and on the southern side of the bay are large salt works, nearly $\frac{1}{2}$ mile southward of which is a monument, named Aguglia, erected by Marcellus, consisting of a square pedestal surmounted by a round column, which has been thrown down. The remains are about 30 feet high.

Dangers.—The shores of the bay on the western side of Penisola Magnisi are fringed by a shallow bank which in some parts extends nearly $\frac{1}{2}$ mile seaward. Secca Salina, with 16 feet water over it, lies 900 yards westward from Punta Tuano and nearly the same distance from the shore.

Secca Vognoli, of small extent, with a depth of 16 feet over it, lies 800 yards southeastward of Punta Vognoli.

Communication.—There is a railroad station on the line between Syracuse and Messina at Priolo, and telegraphic communication at limited hours.

Capo Santa Croce, 5 miles north-northeastward of Magnisi, is low, and close off it is a little islet or rock, named Stoneddo, 2 feet high. The cape is bordered with shallow water, which extends 300 yards off, and it should not be approached nearer than 700 yards.

Light.—From a white circular tower, 89 feet high, with a dwelling attached on Capo Santa Croce, is exhibited, at an elevation of 96 feet above the sea, an occulting white light visible 15 miles. (For arc of visibility see Light List and chart.)

Coast.—Punta Sant' Elia, 1,200 yards south-southwestward of Capo Santa Croce, is 103 feet above the sea, and from this the coast turns to the westward for 800 yards to Punta Izzo.

From Punta Izzo the coast takes a sharp turn to the northwestward, forming the southwestern side of a promontory of which Capo

Santa Croce is the eastern extremity. Between the promontory and Augusta is a shallow rocky bay, named Porto Xifonica, which terminates at its head in extensive salterns.

Porto di Augusta.—The port of Augusta, which is formed westward of Isolotto Avolos, is secure and spacious, capable of receiving a large number of vessels, in 8 to 11 fathoms water. In its north-western part are two old forts, close together, on an islet, the western and larger one named Garzia, and the smaller Vittoria. At the northern end is Mulino Garilli, a conspicuous mill painted with two horizontal black bands on a white ground, and a small vertical white band. The western side of the harbor is watered by several streams, in which eels, mullet, and barbel are caught, and the country is more or less covered with olive trees and cultivation.

Isolotto Avolos, about $1\frac{1}{4}$ miles in length, is narrow, lying northward and southward; its citadel is connected to the low shore on the northward by a bridge, under which is a passage for boats. The western side of the island is fringed by a chain of rocks, just covered at low water.

Cala del Molo is a small basin on the northwestern side of Isolotto Avolos. It has been dredged in most parts to a depth of 12 feet, and affords excellent protection for small vessels except with strong northerly winds. The pratique and harbor master's office is at its northern end.

Compass adjustment moorings.—Moorings for swinging torpedo boats have been established near Pila Point, consisting of five concrete piles, one in the center and one at each of the cardinal points from it.

Cala del Molo—Mooring buoy.—A mooring buoy, for the use of torpedo craft, has been established near the entrance to Cala del Molo, about 80 yards west-northwestward of the end of the northern mole.

Torre Avolos.—Torre Avolos, an insulated fort, stands about 600 yards southward of the southern end of the island; the water between being from 1 to 2 feet deep.

Punta Cantara is nearly 2 miles westward of Torre Avolos, and about that distance north-northeastward of Punta Vognoli, the coast being formed of hillocks, with some small streams running into the sea. The mouth of the Fiume Cantara is about 400 yards north-westward of that point.

Un Dromo.—At 1.6 miles westward of Punta Cantara is a beacon, constructed of masonry, 24 feet wide, 39 feet high, and painted red and white in squares; the beacon, kept in range with Cantara Light-house, bearing 282° , is the leading range mark for entering the port, between the shoals, by day.

Lights—Torre Avolos.—At the northeastern part of Torre Avolos is a white circular tower 58 feet in height, which exhibits, at an elevation of 90 feet above the sea, an occulting white light, visible 12 miles. (For arc of visibility see Light List.)

Punta Cantara.—On Punta Cantara a turret, 7 feet in height, with red and white squares, exhibits, at an elevation of 42 feet above the sea, a fixed white light, which is visible 11 miles over an arc of 9° , which comprises the clear passage between Torre Avolos and Hybla Shoals.

Dromo.—In front of Un Dromo is exhibited, at an elevation of 158 feet above the sea, a fixed and occulting red and white light; it is visible 14 miles. This light, in range with Cantara Light, bearing 282° , leads midway between Torre Avolos and Hybla Shoals. (For sectors and arc of visibility see Light List and chart.)

Cala del Molo.—From an iron lamp-post, erected on the northern mole of the basin, is exhibited an occulting red light.

From an iron lamppost, erected on the southern mole of the basin, is exhibited an occulting green light.

These lights are elevated 16 feet above the sea and visible 5 miles. (For arc of visibility see Light List and chart.)

Pier.—About 600 yards southward of the entrance to Cala del Molo is a pier about 150 feet long with a depth of 18 feet at its extremity.

Dangers at the entrance.—**Secche di Torre Avolos** are rocky, with from 1 fathom to $3\frac{1}{4}$ fathoms water over them, and to the 5-fathom curve extend 1,300 yards south-southeastward from Torre Avolos. The sea breaks heavily on these shoals in bad weather.

Lightbuoy.—A black lightbuoy, exhibiting a flashing green light, marks the southern extremity of shoals. The lightbuoy is located on the following bearings:

Fort Avolos Light.....	339°
Cantara Point Light.....	276°

Hybla Shoal (Secca di Mezzo or d'Ibla), with from $3\frac{1}{4}$ to 5 fathoms water over it, is 800 yards in length eastward and westward and 400 yards in breadth. The sea breaks heavily on it in bad weather. The shoal lies nearly in range and in the middle of the channel, between Torre Avolos and Magnisi Lighthouses, but rather nearer the former.

Secca di Coruzzone, nearly midway between Hybla Shoal and Punta Vognoli, has depths of from $4\frac{1}{4}$ to $4\frac{3}{4}$ fathoms, over rocky bottom, and on which the sea also breaks in bad weather. Within the depth of 5 fathoms this shoal is about 700 yards in length in a northeasterly and southwesterly direction and 400 yards in breadth.

Secca Panaro, having a depth of 4 fathoms, over rocky bottom, is about 100 yards in extent and lies about 700 yards eastward of Punta Genarena.

Secca Dreara or Inflexible Shoal, on which the British naval vessel *Inflexible* touched in the year 1883, is situated in the western part of Porto di Augusta, and has a depth of 4 fathoms. It is about 133 yards in diameter, is of hard bottom, covered with a layer of mud, and has a depth of 5 fathoms close around. From the shoal Torre Avolos Lighthouse bears 103° , distant 1.2 miles.

Macchia di San Guiseppe, a shoal of 4 fathoms, about 150 yards in extent, is situated about 400 yards west-northwestward of the citadel at the northern end of the town.

Directions.—A vessel from the southward, bound to Porto di Augusta, should give Penisola Magnisi a berth of over $\frac{1}{2}$ mile, taking care to keep the lighthouse on Capo Santa Croce well open eastward of Punta Sant' Elia, bearing 0° . When northward of Secca Magnisi the lighthouse may be kept just in range, Punta Sant' Elia bearing 10° , until Punta Cantara Lighthouse and Dromo Beacon Light (before mentioned) are in range bearing 232° ; keeping on this range mark will lead equidistant from Avolos and Hybla Shoals, and when the southwestern bastion at the town is seen in direction of coast line, bearing 0° , steer northward for the anchorage, in depths of 9 or 10 fathoms, abreast the town. On Punta Pila is a conspicuous yellow house close to the railroad; this house, seen between Forti Vittoria and Garzia, bearing 345° , leads up the center of the harbor.

From the northward, after passing Punta Sant' Elia, keep Santa Croce Lighthouse in range with Punta Sant' Elia until Cantara Lighthouse and the beacon are in range, then steer as before. With easterly and southerly gales there is often much swell, which causes vessels lying far out to ride uneasily. The bottom is so stiff as to render it necessary at times to break the anchor out of the ground.

Tides.—It is high water, full and change, in Porto di Augusta, about 3h. 20m., but the tides are irregular. The rise and fall is much affected by the wind, and varies from 4 to 15 inches.

Tidal streams.—Off Capo Santa Croce the current, though influenced by the wind to some extent, appears to be tidal, generally running to the northward while the water is rising, and to the southward while it is falling, and changing from one to two hours after the tide.

Town.—The town of Augusta, ancient Xiphonia, stands on the island of Avolos; it was built in the thirteenth century, and until devastated by the earthquake of 1693, was a place of considerable importance. The streets are regular and parallel, but the houses are small and mean; it has a cathedral and other public buildings.

The town is strongly fortified, and contains a population of about 15,000, partly agricultural and partly commercial.

Communication.—Railroad communication with Syracuse and Messina, the station being on the main island, about $\frac{1}{2}$ mile northward of the citadel; telegraph communication at limited hours.

Coal and supplies.—The Italian Government keeps a large stock of Welsh coal, but exclusively for the use of the Italian naval vessels. A private firm keeps about 2,500 tons of Welsh coal in a coal hulk. There are two coal wharves, one 300 feet in length, with a depth of $18\frac{1}{2}$ feet alongside at low water, the other 150 feet with a depth of 18 feet alongside at low water; 600 tons can be loaded in 24 hours.

Supplies of fresh meat, bread, and vegetables may be procured and are plentiful; beef and vegetables are very good; bread only fair in quality. Abundance of good water may be obtained from a steam tank on application to the harbor master.

Landing.—The landing pier is about 300 yards southwestward of the cathedral.

Trade.—Salt constitutes the principal article of commerce; there is a factory for making citrate of lime and essential oil of lemons.

Capo Campolato.—From Punta Sant' Elia the land gradually rises to 286 feet, forming a ridge to the northwestward, which terminates near Capo Campolato (58 feet high) in a sudden dip. From this ridge, which is a long $\frac{1}{2}$ mile from the coast, the land slopes toward the sea and is partially wooded with olive trees, interspersed with vineyards and cultivated patches.

Porto Brucoli.—About $\frac{1}{2}$ mile westward of Capo Campolato is Punta Tonnara, from whence the shore turns southward and forms, with Punta Bonico, 1 mile to the westward, Porto Brucoli, a small bay about $\frac{1}{2}$ mile deep. At the head of the bay and on a rocky projection, is a small village with a square castle on its extremity. This little bay appears like a work of art rather than of nature, as the rocks rise vertically 40 or 50 feet and contain several grottoes. Small vessels resort hither for wheat, tunny, and stones for building. Fine oysters are obtained here; a rivulet runs into the bay, near which is also a mineral spring.

Light.—About 300 yards southeastward of the castle, in Porto Brucoli, from a yellow turret on a yellow one-story building, is exhibited, at an elevation of 41 feet above the sea, an occulting white light. The light is visible in clear weather from a distance of 10 miles. (See Light List.)

Anchorage.—The anchorage is about 400 yards northeastward of the castle in a depth of 9 fathoms.

Catania Bay may be considered to be included between Capo Campolato and Capo Molini, bearing northward and southward from

each other and 17 miles apart; the depth of the bay is about 5 miles, the shore presenting a long line of low sandhills as far as the lighthouse of Catania. From Catania the coast is generally composed of black lava. In the center is the great plain of Catania or Lentini bounded northward and southward by the Fiume Giaretta and its tributaries; the city of Catania lies at the northwestern head, at the foot of Mount *Ætna*.

Depths offshore.—There is a depth of 10 fathoms within $1\frac{1}{2}$ miles of the beach, at 4 miles above 100 fathoms, and at 12 miles off above 1,000; the bottom is of mud, except close inshore.

Coast.—From the Scaro di l'Agnuni, 5 miles west-northwestward of Capo Campoloto, the sandy beach, backed by low sand hills, trends northward about 11 miles to the lighthouse of Catania, which is white and conspicuous and stands on the black lava point formed by the eruption of Mount *Ætna* in the year 1669. The slopes of the mountain are wooded and well cultivated, studded with villages and detached dwellings, and winding a little within the coast is the railroad to Messina. This part of the coast is generally composed of black lava from 15 to 30 feet high, rising in ridges toward Mount *Ætna*.

Fiume Simeto, which rises on the western slopes of Mount *Ætna*, after a course of about 40 miles through rich, cultivated land, runs into the sea about 5 miles southward of Catania. Its mouth is almost closed at the end of the summer, when the banks of the bar become dry and the depth for $1\frac{1}{2}$ miles within at the lowest stage varies from 2 to 6 feet; but after heavy rains the river overflows its banks 1 mile within the bar. It has been said that fine specimens of yellow, red, and black amber have been collected floating at its mouth.

Catania Harbors—Porto Vecchio.—The old port of Catania is formed by a mole extending from a point of black lava thrown into the sea during an eruption. The mole extends southward 250 yards, then southwestward 130 yards, leaving an entrance about 270 yards wide, but narrowed to about 200 yards by shoal ground fringing the shore. Within is another mole of more ancient construction, forming a basin, *La Darsena*.

Within *Porto Vecchio* vessels moor with their sterns to the mole and heads to the westward, sufficiently protected in ordinary weather, though not in the heavy northeast gales which occur during the winter. The port being small and generally filled with small vessels, it is advisable, before dropping the anchor, to ascertain the position of the moorings and the anchors of other vessels.

Porto Nuovo and L'Avamporto are formed by a breakwater, *Molo Esterno*, which, extending from the shore about 400 yards eastward of the old mole, extends first in a south-southeasterly direction, then southward, and lastly southwestward, and has a total length of 1,460 yards; the head of the breakwater, for a distance of about 25

yards, is painted white to render it more conspicuous against the background of lava. About 400 yards from the root of the breakwater two short arms about 250 feet long extend at right angles from the mole and breakwater, forming a hexagonal basin named Porto Nuovo. The remainder of the space between the breakwater and the shore of Punta Sciara Biscari is called l'Avamporto. The bottom is silting along the inner side of the breakwater.

L'Avamporto.—A new breakwater, westward of the head of Molo Esterno, to protect the port from southeasterly winds, was commenced in 1912; when completed it will extend about 475 yards from the shore, leaving an entrance about 350 yards wide. In 1915, 306 yards from the shore end had been completed.

Lightbuoy.—A lightbuoy exhibiting a flashing red light, and which is moved as the works progress, marks the outer end of the new breakwater. The lightbuoy should be left on the port hand by vessels entering.

Depths.—There is a depth of 5 to 8 fathoms in the entrance to the harbor; 4 to 8 fathoms in l'Avamporto; $3\frac{1}{4}$ to 8 fathoms in Porto Nuovo, and 20 to 23 feet alongside the quays; 22 to 27 feet in Porto Vecchio, and 20 to 23 feet near the quays; 7 to 10 feet in the middle of La Darsena.

Shoals.—A shoal with about 3 feet over it, formed by fragments from the mole, lies about 10 yards from the inner part of the Molo Esterno, and about 120 yards from the southern angle of the root of the transverse mole.

Two other shoals, of a similar character, lie, respectively, 50 yards northward of the lighthouse, on the extremity of the Molo Esterno, and about 30 yards southward from the root of the transverse mole at about 8 and 10 yards from the inner side of the Molo Esterno.

Caution.—Vessels which moor to the Molo Esterno should be careful not to approach within 15 yards of the inner side of the mole, in view of these shoals, and the probability of there being others of the same nature projecting from the base of the breakwater.

Lights—Punta Sciara Biscari.—The principal lighthouse at Catania is a white circular tower, 53 feet in height, with dwelling adjoining, and stands upon Punta Sciara Biscari, $\frac{1}{4}$ mile to the southwestward of the inner molehead of the old port; it exhibits, at an elevation of 96 feet above the sea, a fixed and flashing white light visible 11 miles. (Reported not visible so far, and difficult to distinguish from the town lights.)

Molo Esterno.—An occulting green light is shown, at an elevation of 49 feet above the sea, from a gray iron turret, 29 feet in height, and standing on the extremity of the Molo Esterno; it is visible 12 miles.

Porto Vecchio.—On the western angle of the head of the Inner Mole, on the eastern side of the entrance to Porto Vecchio, a fixed white light, visible 4 miles, is exhibited, but is obscured in a sector to the eastward by the new mole. The light is now shown from an iron trellis mounting, on an iron hut, the whole painted gray.

Porto Nuovo.—On the end of the mole on the western side of the entrance to Porto Nuovo, a fixed red light is exhibited, at an elevation of 27 feet above the sea, from a gray iron support 21 feet high; it is visible 3 miles.

Darsena.—On the extremity of the mole on the eastern side of the entrance to La Darsena a fixed green light is shown, at an elevation of 17 feet above the sea, from a white tower 14 feet in height; it is visible 1 mile.

Two fixed red lights, placed vertically at elevation of 13 and 10 feet, respectively, above the sea, are shown at the harbor office landing place.

The electric lights in the town are liable to be mistaken for the harbor lights from seaward.

Customhouse Quay.—A new quay is under construction at the head of the old port, extending from the inner end of the Inner Mole to the extremity of the mole forming the eastern side of the entrance to La Darsena, and was in an advanced state in August, 1914.

Buoys.—A white mooring buoy, marked "Catania," and the depth of water it is lying in, in meters, painted in black letters, lies on the western side of the entrance to Porto Vecchio; two similar buoys lie in Porto Nuovo, and one similar buoy, in l'Avamporto, bearing 49°, distant 600 yards from Sciara Biscari Lighthouse.

A red cylindrical buoy lies on the eastern side of the entrance to Porto Vecchio.

Pilots.—In ordinary weather pilots are chiefly useful for their knowledge of the many obstructions in the old and new port, and also the positions of the moorings, as well as of the anchors of the vessels there. Pilots will be embarked and discharged 1 mile outside Molo Esterno.

Anchorage.—Temporary anchorage may be obtained in 11 fathoms water, over mud, $\frac{1}{2}$ mile southward of the outer breakwater, with Sciara Biscari Lighthouse bearing about 315°. This, however, is a dangerous anchorage during winter, and should be quitted immediately there is a sign of a gale from the northward and eastward.

Directions.—Approaching Catania from the southward the coast may be approached anywhere to the distance of 1 mile or until the breakwater lighthouse or light is sighted. If from the northward, after passing the Cyclops, vessels may steer to pass about $\frac{1}{2}$ mile southward of the breakwater lighthouse, and rounding the end of the

breakwater, into l'Avamporto, leaving the light buoy marking the breakwater constructing on the port hand.

Tides.—It is high water, full and change, at L'Ognina, 2 miles northeastward of Catania, at about 3h. 25m., and the rise is from 3 to 12 inches. The times of high and low water are, however, irregular, being influenced by the force and direction of the winds.

Tidal streams.—From Catania to Capo Molini, in calm weather, there is a regular easterly and westerly stream of about $\frac{1}{2}$ knot an hour, which turns about $\frac{1}{2}$ hour after and 6 hours before high water at L'Ognina, but in general the stream sets in the direction of the wind.

City.—This celebrated city (the ancient Catana), founded B. C. 732 by Naxos, stands at the foot of one of the ridges from Mount *Ætna*, about $14\frac{1}{2}$ miles southward of the mount, and at the extremity of an extensive plain. It has suffered much at different times by wars, earthquakes, and volcanic eruptions; by an earthquake in 1693 it was all but totally destroyed and 50,000 inhabitants perished; overwhelmed as it has often been by torrents of liquid fire, it has always risen from its ruins.

Catania has a noble appearance from seaward, and the effect is not diminished on landing, for its streets are regular, spacious, and handsome, and the numerous churches (four having conspicuous cupola towers), convents, palaces, and public establishments, principally constructed of lava, faced with magnesian limestone and enriched with marbles, are magnificent; the city is lighted by electricity.

The streets are paved with lava, houses are built of it, ornamental chimney pieces, tables, and a variety of other things, are made of lava, and also the moles in the harbor.

The environs are well cultivated and fruitful, and in the year 1911 the city contained a population of 211,699. At $2\frac{1}{2}$ miles westward is the town of Misterbianca.

Communication.—Weekly steamers to Genoa, Tripoli, Palermo, Brindisi, Fiume, Marseille, and Venice; fortnightly to Odessa; monthly to London, Liverpool, Amsterdam, Hamburg, Hull, New York, Venice, Batum, Calcutta, and Montreal. By railroad with Palermo, Syracuse, Messina; also a railroad around the base of Mount *Ætna* to Riposto; and by telegraph with all lines. The telegraph office is always open. Electric tramways run in the streets, and a line is being constructed to Acireale.

Consul.—The United States is represented by a consul and vice consul.

Coal and supplies.—About 7,000 tons of coal are kept in stock, and about 400 tons could be put on board in 24 hours. There are 25 lighters holding from 25 to 30 tons, and, by giving notice, from

200 to 250 tons could be ready, loaded in lighters; there is a coal wharf 950 feet long, with a depth of 25 feet alongside; southeast winds may impede or prevent coaling.

Supplies of fresh meat, vegetables, and bread may be procured, and excellent water is brought off in harbor tanks.

Repairs.—Medium repairs to machinery can be effected, and there are three machine shops for small repairs; a crane will lift 5 tons. Two divers may be obtained.

Hospital.—The Hospital Vittorio Emanuel, with 120 beds, receives strangers at a fixed charge.

Time signal.—From the roof of the Observatory (Convent of the Benedictines) a black ball is dropped at 23h. 0m. 0s. Greenwich mean time, corresponding to noon, mid-European time; the ball is hoisted 3 minutes before the signal is made, and a gun fired simultaneously with the dropping of the ball, which is only hoisted a short distance above the buildings and requires a glass to distinguish it.

Trade.—There is an important factory for the production of bisulphide of carbon, and two factories for the extraction of sulphide of olive oil. The principal exports consist of sulphur, green and dry fruits, oranges and lemons, wine, and oil; and imports of cereals and vegetable produce, coal, hides and skins, iron and metals, timber and furniture.

Mount Ætna.—The coast between Catania and the Fiume Alcantara, $19\frac{1}{2}$ miles to the northeastward, forms the eastern limit of the base of Mount Ætna. This celebrated mountain is bounded on the north by the Alcantara, on the south and west by the Giaretta, and is considered to be about 87 miles in circumference; its summit, 10,880 feet above the sea, lies 15 miles northward of Catania.

The length of the ascent varies on different sides of the mountain; that from Catania being about 24 miles, from Linguaglossa 18 miles, and from Randazzo scarcely 12 miles. Numerous villages, monasteries, and dwellings surround its base, having in all a population of about 180,000.

Randazzo, on the northern foot, is a battlemented town, with three churches, and to the westward of it is a lake 2 miles in length. The extent of the base of Mount Ætna gives generally so easy an inclination to the sides as greatly to facilitate the ascent; but at the same time it diminishes the grandeur of its aspect at first sight, and its commanding elevation is scarcely perceived until the traveller has accomplished half the ascent, when, with Sicily lying at his feet, the summit still appears as far off as at first.

The mountain is divided by nature into three regions or zones, viz., the fertile, the woody, and the desert, to these may be added the fiery region, consisting of the central cone and crater.

The lower or fertile zone varies greatly in width, being 11 miles broad above Catania, but only $1\frac{1}{2}$ miles on the northern side; it is composed almost entirely of lava which, in the course of ages, has pulverized and become converted into a very fertile soil.

The woody region begins and terminates abruptly, is 6 or 7 miles in width, and reaches an elevation of about 6,400 feet; the greater part of the ground is covered with ferns and aromatic plants. In the lower parts, the trees are principally oak and chestnut; in the middle they are almost entirely oak, some of them attaining an immense size; in the upper part the oaks decrease in size, and are intermixed with pines; as the mountain is ascended the oaks gradually disappear, the firs become stunted, until finally all vegetation ceases, and the desert is entered.

The desert region is a dismal tract, forming an irregular plain about 9 miles in circumference, fully of gloomy and rocky hollows and immense chasms, formed of black lava, scoriæ, ashes, and volcanic sand, covered for the greater part of the year with snow, while ice is always found in the hollows.

In the midst of this gloomy region the great cone, at the summit of which is the principal crater, rises to the height of about 1,100 feet above the plain; it is very precipitous, and as it consists of loose scoriæ and ashes, which frequently yield under foot, the ascent is extremely laborious. The bottom of the crater is apparently flat and tolerably hard.

The ground round the crater is so hot that visitors are obliged constantly to shift their places, and yet even here snow is seen in immense ridges. The view from the summit, on a clear day, is superb beyond description. Sicily is spread out like a map, and every river is traceable; the Faro of Messina, the Calabrian coast, and the Lipari Islands are distinguishing features in this magnificent panorama, which at times extends to Vesuvius on the north, and Malta on the south.

The first recorded eruption of *Ætna* was in 475 B. C., the last on January 31, 1865.

L'Ognina.—The village and cove of L'Ognina are rather more than 2 miles northward of Catania. There are from 3 to 10 fathoms water in the cove, from which a great quantity of squared lava is annually shipped for building purposes. Off the southern side of the northern entrance point is *Secca Vincenzo*, on which the depth is 7 fathoms, over rock, with 10 to 13 fathoms inside, and a rock, with 1 fathom water over it, lies rather less than 100 yards from the shore of the southern point of *Cala di San Giovanni*, about $1\frac{1}{2}$ miles to the northeastward of *Catania Lighthouse*.

Water, in small quantity, may be obtained from a public fountain.

Aci Castello.—At 2 miles beyond L'Ognina is the little town of Aci Castello and the ruins of a castle, on an enormous cliff of lava, rising vertically from the sea. The town is irregular and dirty, but with its castle is extremely picturesque in appearance.

Capo Molini, about 2 miles to the northeastward of the town of Aci Castello, is a remarkable promontory of lava, with a square tower on it, named Torre Santa Anna. On the northern side of the cape is the village of Santa Anna, and on its southern side the little bay and village of Molini; midway between the latter and Aci Castello is the loading place of Aci Trezza, a small town built entirely of lava, the dark hue of which, contrasted with the whitewashed lintels and doorposts of the houses, has a singular appearance. On the northern side of the cape are many rocks.

Cyclops (I Cyclopi).—Directly in front of the town of Aci Trezza, about 1 mile to the southwestward of Capo Molini, and less than 700 yards from the shore, are the Cyclops (the Cyclopum Scopuli of the ancients), four small islets having a bold and singular appearance. The largest and nearest to the cape is flat, and about 82 feet high, the others are pinnacles 142, 92, and 66 feet, respectively, above the sea; the two western are nearly connected by rocks to the shore.

About $\frac{1}{4}$ mile westward of the westernmost pinnacle, and 100 yards from the shore, is a rock awash, with 7 fathoms water close outside it.

Anchorage.—In Baia Aci Trezza, formed between Cyclops Rocks and Capo Molini, anchorage may be taken up under favorable circumstances: the water is deep, and the bay is open to the eastward, but some protection is afforded from the northeastward by the point. A large vessel can anchor in 20 fathoms water about 600 yards from the beach, which is composed of large black stones, the bottom is dark, coarse sand. A current is here experienced running at times $\frac{1}{4}$ knot an hour, but without any regularity. Vessels should leave the anchorage when thick clouds hang over Mount *Ætna*, as it is considered a sign of a breeze from seaward.

Aci Reale.—A short distance northward of Torre Santa Anna, on Capo Molini, the cliffs suddenly gain in height, and at Aci Reale they are 600 feet above the sea; here the ridge of cliffs and the coast line separate, the former turning a little to the westward, and the latter trending to the northeastward.

The town of Aci Reale, containing a population of 35,126 in 1909, stands on a steep mass of basaltic lava; it is in a healthful situation, clean, and regularly built, with a castle, several churches, convents, and other public buildings; it has manufactures of silks, linen, cutlery, etc.; and the exports are wine, cotton, flax, and diaper. The port is small, the mole being formed by lava, and a road supported on arches leads up to the town; it is celebrated for its mineral springs, caves, and grottoes.

Shoal.—A shoal with $2\frac{1}{2}$ fathoms over it lies about $\frac{3}{4}$ mile southward of Aci Reale landing place, and about $\frac{1}{4}$ mile from the shore.

Communication by railroad with Catania and Messina; also by telegraph. The telegraph office is open till 9 p. m.

Supplies of fresh provisions may be procured.

Riposto.—About 10 miles northward of Capo Molini are the modern towns of Riposto and Giarre; the first, situated on the coast, has a small fort and a population of about 10,000; the latter town, almost adjoining the former, is immediately inland of it. This district produces the finest grapes in the island.

Lights.—A fixed white light is exhibited, at an elevation of 36 feet above the sea, from a small tower, 19 feet in height, surmounting a white building, situated on a point locally known as Chiancona, southward of the town; the light is visible 8 miles. (For arc of visibility see Light List.)

A provisional fixed red electric light, which is moved out as the work progresses, marks the outer end of the mole under construction.

Mole.—A mole extended about 200 yards from the shore end in November, 1913, and in 1916 had been extended 158 yards perpendicular to the coast, thence 109 yards north-northwestward. Work was still in progress.

Mooring buoy.—A white iron mooring buoy, with "Genio Civile Catania" in black letters on it, lies in 28 fathoms about 800 yards from the shore.

Anchorage may be obtained off the town, but only in fine weather.

Communication.—A line of steamers between Catania and Messina call here; there is also communication with Genoa, Odessa, Venice, Marseille, and Trieste. There is railroad communication with Catania, Syracuse, and Messina. Telegraph communication with all parts; the telegraph office is open till midnight.

Supplies of fresh provisions may be procured in abundance, but the water is only fair in quality.

Coast.—From Riposto the coast trends in a northeasterly direction, for 6 miles, to Capo Schiso, and on this stretch of coast several streams enter the sea; about midway the Fiume Freddo, a perennial stream, deep and clear, rushing from several springs situated at about $1\frac{1}{2}$ miles from the coast, differs in this respect from the other streams, which, like the Alcantera and Minissale, are dry beds in summer.

Anchorage.—During fine weather temporary anchorage may be found anywhere along the shore between Riposto and Capo Schiso.

Fiume Alcantera.—The Alcantera (ancient Onabala) flows in an easterly and southeasterly direction for about 50 miles around the northern slopes of Ætna, and enters the sea in a sandy bay about 5 miles from Riposto; in the summer it is nearly dry, but with the

melting snows from the mountain it becomes a rapid torrent of considerable dimensions. There are several villages adjacent, including the town of Randazzo already mentioned, about 16 miles from the coast. Northward of the river are the steep slopes of the Pelorean or Neptunian Range, extending the whole length of the island.

Capo Schiso is low and black, and was formed by one of the earliest and longest streams of lava known; on it is an old castle and other ruins; it is also the site of the ancient town of Naxos, one of the earliest Greek settlements in Sicily. The point is skirted by rocks, and inside, immediately opposite the ruined castle, is a nook where landing can always be effected.

Baia di Taormina, between Capo Schiso and Capo Taormina, $1\frac{1}{2}$ miles apart, is about 1,200 yards deep, and affords tolerable summer anchorage in from 8 to 30 fathoms water, over fine sandy bottom near the shore and mud farther out, but it is exposed to all easterly winds. On the shore in the middle of the bay is the village of Giardini, and southwestward of it the marble statue of Santa Pancrazio, now hidden from seaward by houses. The line of railroad to Messina skirts the bay and passes close behind the village.

Anchorage.—The best berth in the bay is in the southern part, in 10 fathoms water, with Cape Schiso, bearing 187° , distant 900 yards.

Secca Tremiti, having 7 feet water over it, lies 300 yards from the shore and 1,100 yards northward of Castello Schiso, or about $\frac{1}{4}$ mile from the berth recommended. There is a depth of 3 fathoms close seaward of the rock. The shores of the bay are skirted by rocky and foul ground, which in some parts extend nearly 400 yards seaward.

Town.—The town of Taormina (ancient Tauromenium), with a population of about 3,000, is situated on broken, elevated ground faced by steep cliffs, 565 feet above the sea, at the northern head of the bay. Partly inclosed by ancient walls, it contains several churches, convents, and other public buildings, and is crowned by the magnificent ruin of a Saracenic castle. The trade is chiefly in wine, oranges, lemons, sumach, and olives.

Rising above it again is the small town of Mola, on a steep and picturesque elevation, 1,735 feet above the sea, with ruined walls and castle, and around are numerous remains of its once important position; chief above all is that of the theater, eastward of the town, on a rise 800 feet above the sea. It is probably of Greek origin and is the object of universal admiration, being wonderfully well preserved and capable of accommodating about 40,000 spectators.

Communication.—There is a station at Giardini, on the line between Catania and Messina, and a regular service of coaches to Taormina.

Supplies of fresh provisions and water in limited quantities may be obtained.

Landing.—With an easterly wind, landing is dangerous at Giardini.

Capo Sant' Alessio, about 5 miles to the northeastward of Capo Taormina, is an abrupt, bold cliff, bordered with rocks, with a tower and redoubt on it, and above it the old tower and Castle of Forza d'Argro. The coast to the northeastward of the cape is a steep, bold beach, through which numerous mountain torrents run into the sea, and along which and on the rising ground above are several towns and villages prettily interspersed, of which the principal are Savoca, famed for its wine, Pagliara, Roccalumera, and Nizza, the last being romantically situated under an ancient castle, near the mouth of a stream.

Rock.—A rock, with a depth of 6 feet over it, lies about 400 yards southward of Capo Sant' Alessio.

Punta Grosso (Capo d'Ali), nearly 8 miles northeastward of Capo Sant' Alessio, is a bluff headland, with rocks at its base. The town of Ali, of great antiquity, is just within the cape, and for ages was in great estimation on account of its mineral waters. It stands on a declivity of Monte Scuderi, 4,111 feet above the sea, and is remarkable for the constant wind blowing with some violence out of a cavern near its tabled summit. About 3 miles westward of the point, on a high peak, is Castello di Belvedere.

A line from Punta Grosso to Capo dell' Armi on the coast of Calabria opposite, may be considered as the southern entrance to the Faro or Strait of Messina. The serrated hill of Pentadattillo (ancient Pentedactylus), 1,515 feet above the sea, which derives its name from its five crags and insulated base, and bears a great resemblance to the human hand, will be seen rising over the latter cape; about half way up the hill is a castle.

Capo Scaletta.—About $2\frac{1}{2}$ miles beyond Punta Grosso the beach is broken by Capo Scaletta, a rocky point with an old tower on it, and just above it are the upper and lower towns of the same name. Between Capo Scaletta and Messina, a distance of 10 miles, in a north-northeasterly direction, the coast, which slightly curves, is a steep sandy beach, with from 10 to 50 fathoms water 200 yards from it. Along the coast and upon the slopes within are scattered towns and villages, convents, etc.; the chief of the former are San Paolo, Galati, and Gazzi, and of the latter Briga, Lardaria, and Bordanaro.

The mountain range, the foot of which recedes from the coast as Messina is approached, falls, at a distance of about 4 miles inland, from an elevation of between 3,000 and 4,000 feet above the sea; it is broken by numerous watercourses, which are generally wooded; there are also many vineyards and well-cultivated grounds.

Communication.—Scaletta has communication by railroad with Syracuse and Messina, also telegraphic communication.

Anchorage.—Temporary anchorage for small vessels will be found close in off San Paolo, distant 1 mile from the cape.

Porto di Messina is formed by a curved tongue of land, projecting first northeastward from the mainland, and then bending round north and west in the form of a sickle, and named the Braccio di San Ranieri. Upon this ground are the British and French cemeteries, the coal depot, and dock, with some salt works; the custom-house and pratique office are on the opposite side.

The entrance on the north, about 350 yards wide, is defended on the west, or land side, by a battery, and at the extremity of the curved projection by Forte Campana and San Salvatore. The basin thus inclosed is about $1\frac{1}{2}$ miles in circuit, having from 10 to 36 fathoms water, over sand and mud; but on the eastern side of the harbor a bank, having $3\frac{1}{2}$ to 4 fathoms water, extends 100 to 200 yards from the shore. In 1912, works were in progress on the eastern side between the citadel and the coal depot.

Lights.—On Punta San Raineri (Ranieri), the eastern extremity of the tongue of land forming Porto di Messina, is a white octagonal turret on a gray square tower, the whole 129 feet in height, and exhibiting, at an elevation of 136 feet above the sea, a flashing white light visible 17 miles.

On Punta Secca, the northeastern elbow of the land forming the harbor, from iron supports above a dwelling, the whole 19 feet in height, is exhibited, at an elevation of 26 feet above the sea, a flashing red light visible 10 miles. (For arc of visibility see Light List.)

Two fixed red lights, exhibited vertically, 13 feet apart, the upper one 76 $\frac{1}{2}$ feet above the water from a truss, above a small white house situated on Forte Campana. The lights are visible 6 miles.

From a pole near the health office on the western side of the entrance of the harbor two fixed green lights are exhibited at elevations of 29 feet and 39 feet, respectively. (For arc of visibility see Light List.)

When the ferry boats are approaching a green light is shown from the western mole of the landing place and a red light from the eastern mole; two red lights, placed vertically, are also shown at the same time near the green light.

Buoys.—A cylindrical buoy is moored near the entrance to the dry dock. Man-of-War Buoy 1 is located 590 yards 143° from Fort San Salvatore Light.

Several bollards on the beach in the northern part of the harbor are not trustworthy.

Pilots.—As the currents are often very strong and variable, it would be imprudent to take a sailing vessel into port without a pilot.

Large vessels should obtain the assistance of the harbor master in taking up berths.

Mooring buoys.—Five mooring buoys for large vessels have been established in the middle of the port, located as follows:

Buoy No. 1, 330 yards 149° from Fort San Salvatore Light.

Buoy No. 2, 500 yards $176^{\circ} 30'$ from the same light.

Buoy No. 3, 710 yards 181° from the same light.

Buoy No. 4, 590 yards $198^{\circ} 30'$ from the same light.

Buoy No. 5, 275 yards $193^{\circ} 30'$ from the same light.

A mooring buoy for the use of Government vessels lies to northward of the dry dock, and three mooring buoys for torpedo craft are situated in front of the liquid-fuel piers.

Anchorage.—The best berths within the harbor for large vessels, of which there are three good ones, are between Via Vittorio Emanuele and a line joining Forte Campana with the railroad station, the anchors being laid out north and south; room must be left for merchant vessels to moor with their sterns to the western shore, and also for those moored to the buoys upon the eastern side of the harbor.

The harbor, however, is so encumbered with moorings that considerable difficulty is experienced by vessels anchoring in laying the anchors clear of the numerous chains. Small naval vessels find convenient positions at the head of the port, their anchors out to the northward and their sterns fast secured to the bollards on shore.

Vessels not wishing to enter the harbor may find temporary anchorage a little northward of the convent of San Francesco di Paola; the holding ground is good, but it should be observed that, like the harbor of Messina, this anchorage is much subject to eddies, and it is difficult, if not impossible, to keep the anchor clear if the vessel should remain more than a few hours. The shallows must be avoided which lie off the river's mouth a little to the southward. The anchorage directly off San Francesco di Paola is encumbered with anchors and chains and should be avoided.

Convenient anchorage may be taken up, near the convent of Salvatore dei Greci, in depths of 10 and 20 fathoms, over sand. The convent, now used as barracks, is a large square building with a few small windows in the southern part of the building, and may be identified by a limekiln with a black-topped chimney immediately to the northward of it. The anchorage is off a conspicuous villa striped red and white.

In the months of December, January, and February it is better to moor with both bowers, with an open hawse to the northward, as heavy gusts of wind blow down from that quarter, and without a

sufficient scope of cable, the whirl and strength of the current, and the squalls combined, are likely to drive the vessel off the bank. With northeasterly winds, the anchors, with a good scope of cable, are not likely to drag, as the direction would be uphill.

Caution—Coast line extending.—Owing to the deposit of the ruins of the city the coast line between the health office and the point southeastward of the gasometer is extending seaward.

Prohibited anchorage.—Anchoring immediately to the southward of Forte San Salvatore is prohibited.

Vessels are prohibited from anchoring on the western side of the strait in the approach to Messina Harbor within the following limits:

(a) Between the parallels of Fort Campana and the citadel.

(b) Between Annunziata River and a point situated 100 yards southward from the entrance to San Francisco di Paola River.

Directions.—Vessels bound for this port should, for entering the strait, follow the general instructions given on pages 564, 565, and also take advantage of the current (see p. 560). When the wind and current are adverse it is necessary for sailing vessels to anchor until the current becomes favorable. When the wind is very strong it is advisable for a vessel not to attempt to enter the harbor, but to anchor either opposite Paradiso or Salvatore dei Greci. With a strong east-southeast wind sailing vessels can not enter the port, and may anchor off the entrance, dropping two anchors, and taking a hawser on shore as a precaution, in case of a change of wind.

In entering Messina Harbor give Punta San Raineri and Punta Secca a berth of at least $\frac{1}{2}$ mile, on account of the strong tide races which during spring tides extend from them. The British naval vessel *Invincible*, entering under steam during spring tides, was twice turned by the tide eight points against the helm, the speed of the vessel being 7 knots.

Leaving the harbor with a northeast wind, sailing vessels should warp up under the walls of San Salvatore, and remain there until the tide sets out. With a northwest wind the vessel must be hauled over under the health office, and thence make sail offshore.

Caution.—There is no regular tidal stream at Messina, but a rush of water occasionally enters and sweeps round the harbor, causing a variable current at the buoys, often running in opposite directions within an interval of five minutes; caution is therefore necessary when making fast to a buoy, especially if vessels are secured to those adjacent to it.

City.—The city of Messina, formerly Messana, of which but few vestiges remain, stood on the site of Zancle or Sickle, from the shape of the harbor, a city founded in the year 732 B. C. In the year 1783 the city was almost destroyed by an earthquake, but was rebuilt,

and became a flourishing and beautiful city until 1908, when, on December 28, one of the most disastrous earthquakes ever recorded destroyed it totally. In 1911 the clearance of the old city and the rebuilding of a new one on its site was commenced, and it is hoped very shortly that Messina will regain her former commercial prosperity. The population of Messina, including the outlying villages, is about 126,172.

Communication.—Almost daily communication by steamer with Naples (18 hours); twice every week with the Lipari Islands; weekly to Palermo, Naples, Leghorn, Genoa, Catania, Syracuse, Malta, and Tripoli; fortnightly to Stromboli, Tunis, Algiers, Oran, Malaga, Gibraltar, and Tangier; besides which several lines of steamers to the Adriatic, Constantinople, the Black Sea ports, and Alexandria, call at the port. The Cunard Line emigrant steamers to the United States call here regularly.

Ferryboats, which leave from a pier southwestward of the citadel, make two trips a day to Reggio in connection with the train service.

Railroad communication with Palermo and Syracuse, a steam tramway to Barcellona, northward, and Giampileri, southward, which is shortly to be electrified. Telegraphic communication with all parts; the telegraph office is always open.

Coal and supplies.—About 9,000 tons of coal are kept in stock; there are 30 lighters, holding from 20 to 25 tons; also a coal wharf 400 feet in length, with depths of from 19 to 24 feet alongside, but it was damaged by the earthquake. Coaling is now (1912) carried out by means of a 7,000-ton coal hulk, fitted with electric light, transporters, traveling cranes, and all modern appliances.

Supplies of fresh meat, vegetables, and bread, can be procured, and water from a public fountain, pure, but somewhat hard. Tank vessels are always available, and water is also supplied by the coal hulk. Water may also be obtained by digging holes in the sand on either side of the strait.

Dock.—There is a dry dock on the eastern side of the harbor. (For particulars, see Appendix I.)

Harbor regulations.—The speed of any vessel, when entering or leaving the port, is not to exceed 5 knots.

Time signal.—Near the northeastern end of Forte San Salvatore a time ball is dropped and a gun fired simultaneously by electricity, at noon, Central European time, corresponding to 23h. 0m. 0s. Greenwich mean time.

Trade.—The principal exports are wine, silk, lemons, oranges, pumice stone, walnuts, and filberts; and imports, coal, timber, petroleum, wheat, and stock fish.

Strait of Messina.—El Faro, or Strait of Messina (the Fretum Siculum of the ancients), is bounded on the south by Punta Grosso and Capo dell' Armi, on the Calabrian coast, where it is 12 miles wide; from thence it trends in a northerly direction for a distance of about 14 miles, gradually narrowing to a width of $2\frac{1}{4}$ miles off Messina, from thence it curves to the northeastward, and has a width of $1\frac{1}{4}$ miles between the overlapping points of Sicily and Calabria, finally entering Golfo di Gioia, northward of Cape Peloro.

This strait, dreaded by the ancients, and invested by them with many imaginary terrors, requires some caution in its navigation on account of the rapidity and irregularity of the currents, known to them as the Charybdis, but now locally termed Garofali. The winds are also baffling when off the highland, and heavy gusts blow down the valleys and gorges; without a steady and commanding breeze a sailing vessel may become quite unmanageable, and a vessel under steam be turned around. The strait is everywhere clear of danger and the water deep.

Local winds.—In winter the strongest and most frequent winds are those from the east-southeast and west-southwest, the latter being accompanied by a heavy sea. In this season the conflict between opposing winds is frequent, especially when that from the northwest, which blows down the Tyrrhenian Sea, is fresh.

West winds are not so lasting as those from southeast and southwest; they may blow very fresh, but soon moderate. The southeast wind, on the contrary, becomes stronger and stronger, and blows sometimes for 15 successive days. The wind from southwest generally follows, but lasts only a short time, gradually veering to the northward, when fine weather is reestablished.

In summer the fine weather is accompanied by winds from the northwest and north; when from the latter quarter it is nearly always calm in the Strait of Messina; while at Messina itself and Reggio the breeze is sometimes very fresh, it generally, however, falls in the evening, and does not raise much sea. During the fine season the strait is the line of separation of winds from east and southwest. The clouds brought by the latter accumulate over the strait, where it is a dead calm, while a fresh breeze blows outside.

At times a northerly wind blowing through the strait meets a southerly some 20 miles below it, or a wind from the Adriatic, off Capo Spartivento, causing much aerial commotion. On the coast of Sicily, between Taormina and Riposto, this is locally named Del Golfo di Cantara.

Precautions should be taken against the heavy gusts, dangerous to small vessels, which at times rush down the valleys.

Currents and tidal streams.—The currents in the Strait of Messina are variable, and at times attain a velocity of 5 knots an

hour. They are, however, to a great extent tidal, their greatest strength being on the day following the full and change of the moon. Occasionally the tidal streams are overpowered by other general movements of the water in the neighborhood, from winds or other causes, and the stream may then run in one direction for many hours.

The stream runs to the northward with a rising tide and to the southward with a falling tide, but near the coast there are counter-currents of which the mariner may take advantage. These counter-streams, which are felt between one and two hours after the commencement of the main stream, are termed *Refoli* when produced by the falling tide, and *Bastardi* when caused by the rising tide.

On the Sicilian side the principal counterstreams of the ebb occur between Torre Palazzo and Capo Peloro, Pace and Fiume Guardia, Salvatore dei Greci, and S. Francesco di Paola. The breadth of these countercurrents increases in proportion as the general stream has more duration, and is important during springs, when they extend 1 mile from the shore.

On the Calabrian side the counterstream on the ebb does not occur northward of Punta Pezzo, but thence southward to Catona (opposite Messina) is about 1 mile in breadth. With the northerly stream the only important countercurrent or *Bastardi* on the Sicilian side occurs in Messina Strait, between the lighthouse and Punta Palazzo; the others are insignificant.

On the Calabrian side, however, 2 hours after high water, between Alta Fiumara and Punta Pezzo, there is an eddy setting to the southward, having its greatest breadth off Cannitello, where it extends about $\frac{1}{2}$ mile from the shore.

At full and change the southerly stream begins at 9h. a. m. at Capo Peloro, Messina Strait, and sets toward Alta Fiumara in Calabria, thence to Punta Pezzo and toward Pace in Sicily; afterwards to Salvatore dei Greci, arriving off the northeast lighthouse of Messina about 11h., setting thence toward Reggio in Calabria.

At full and change the northerly stream commences about 3h. at Punta Pezzo, gradually enlarges, and uniting with the counter-current between Torre Palazzo and Punta Sottile, the whole stream runs to the northeastward in the direction of the channel. After two hours its direction changes toward Scilla, but at the same time a stream from the north unites with the former near Scilla, and causes a current toward the offing. At Messina the northerly current does not commence till about 5h.

At neaps the southerly streams follow the same direction as those of full and change, and produce the same countercurrent, but with less velocity. It begins at Capo Peloro at 0h. 45m. and off Messina at 3h. 45m. At Capo Peloro the rise of water is scarcely per-

ceptible; at Messina the maximum rise is from 10 to 13 inches, but it is greatly influenced by the winds.

The meeting of the two opposing currents produces in several parts of the strait whirls and great rippings, locally termed "Garofali"; they are represented on the chart by a scroll. The principal are on the coast of Sicily, between Capo Peloro and Punta Sottile, with the ebb, and off Torre Palazzo with the flood; the latter are very strong. Off Punta Secca, the northeastern extremity of the Braccio di San Ranieri, it is also very strong and dangerous with a south-east wind.

At Punta Pezzo, on the Calabrian coast, there is a very strong Garofali, which is also dangerous with a southeast wind. The other great rippings without whirls, caused by the current over the uneven bottom, are termed *Scala di Mare*.

To the southward of Capo Peloro in Calabria the tidal streams are not felt, and the current generally is determined by the wind.

The celebrated vortex of Charybdis, so much dreaded by the ancients, is described by Admiral Smyth as that outside the Braccio di San Ranieri, but in the French survey of the strait in 1858 the position of Charybdis is assigned to the Garofali, immediately southward of the Faro, and this being so much nearer Scilla would be more in accordance with the famous proverbial expression, "*Incidit in Scyllam cupiens vitare Charybdim*," applicable to those who, to avoid a less, run into a greater danger.

Pilots.—As before remarked, the navigation of this strait is at times difficult, on account of the various movements of the current, it would therefore be imprudent for a stranger to take the passage in a sailing vessel at night without a pilot. If from the northward, pilots are found some miles to the northward of Capo Peloro Light; if from the southward, 3 or 4 miles southward of Messina.

Paradiso—Mooring buoy.—A mooring buoy, suitable for large vessels, has been established in Paradiso Roads about $1\frac{3}{4}$ miles northward of Punta San Raineri.

Gun practice occasionally takes place from the forts on each side of the strait; when a fort is firing a red flag is hoisted, and vessels are warned thereby to keep at a distance of 3 miles from the fort.

Anchorage.—Between Paradiso and Capo Peloro are the following anchorages:

Pace (Grotta).—In from 11 to 16 fathoms water, over sand, about 300 yards from the shore, and northeastward of the remarkable cupola of Santuario della Grotta.

Communication.—A steam tramway runs to Messina and Barcellona, and there is telegraphic communication during limited hours.

Supplies of fresh provisions and water may be procured in limited quantities.

Canzirri (Ganzirri).—The anchorage is in front of the village, in about 6 fathoms water, over sand, with good holding ground, but in winter it is exposed to winds from southeastward which cause a heavy sea.

Communication.—Steam tramways to Messina and Barcelona.

Supplies.—Moderate supplies of fresh provisions may be procured.

Piana di Faro.—Anchorage may be obtained off the village in 16 fathoms water, about 150 yards from the shore.

Communication.—A regular service of steam tramways to Messina and Barcellona, and good roads.

Supplies of fresh provisions and water, in limited quantities, may be procured.

Calabria.—The anchorages upon the Calabrian side of the strait are scarcely available for strangers except in cases of emergency, as the water is deep and the shore steep. The best places are in the bay off Marina di Scilla, where there is a lifeboat; off Reggio, and in the bay $1\frac{1}{2}$ miles northward of it; and to the southward, about the same distance northward of Punta Pellaro. Except off Scilla there are depths of from 16 to 20 fathoms, at 100 yards from the shore.

Between Messina and Capo Peloro the shore is everywhere bold, and there are no dangers more than 300 yards distant.

Prohibited anchorages.—Vessels are prohibited from anchoring off the coast of Calabria between a point situated about 300 yards southward of the port of Villa san Giovanni and the entrance to Catona River.

Telegraph cables.—Four telegraphic cables are laid across the Strait of Messina; anchorage in the vicinity of the cables is prohibited.

Capo Peloro or di Faro, the northeastern extremity of Sicily, was the Pelorum Prom. or Cape Pelorus of the ancients. It is a low sandy point, which is being gradually washed away, and near its extremity is an old fort on which is a lighthouse; there are also two other lighthouses, one westward and one southward of the old fort. The village of Faro stands on the coast $\frac{1}{4}$ mile southwestward of the old fort. Between the beach and the hills, on the eastward and southward, are two lakes, named Pantano Grande and Pantano Piccolo, united by a canal, the village of Canzirri and two towers are between Pantano Grande and the coast.

Lights.—From a turret on the tower of the old fort on the eastern extremity of Capo Peloro, at an elevation of 85 feet above the sea, is exhibited an occulting white light, visible 12 miles.

At Punta Sottile, 350 yards southward from the preceding lighthouse, a gray cylindrical iron shed, exhibits an occulting green light. It is elevated 26 feet above the sea, and is visible 4 miles.

A fixed green light, visible 2 miles, is exhibited from a white circular tower, 39 feet in height, on Punta Mazzone, about $\frac{1}{2}$ mile westward of Capo Peloro, to mark the position of the telegraph cable laid between Calabria and Capo Peloro. (For arc of visibility see Light List and chart.)

Signal station—Semaphore—Storm signals.—Upon Forte Spuria, on the hill, nearly $1\frac{1}{4}$ miles westward of the lighthouse of Capo Peloro, is a semaphore, 321 feet above the sea, with which vessels may communicate. Storm signals are also shown here.

Anchorage.—A bank, with a depth of from 1 fathom to 5 fathoms over it, extends nearly 600 yards eastward of Capo Peloro; at $\frac{1}{2}$ mile distant from the cape there are 20 to 30 fathoms, when the water rapidly deepens to 150 fathoms in mid-channel. Temporary anchorage will be found on the bank, in from 10 to 20 fathoms water, over sandy bottom, with Spuria Semaphore brought either just northward or southward of the lighthouse; it is, however, exposed, should be used only in summer under favorable circumstances, and care must be taken to avoid the wrecks that lie there.

Prohibited anchorage.—Anchorage or fishing is prohibited within the area covered by the sector of visibility of the light on Punta Mazzone in order to avoid fouling the telegraph cable.

Caution.—Steamers proceed through the fairway of the strait, and give Cape Peloro a berth of not less than $\frac{1}{2}$ mile.

Sailing vessels.—It would not be prudent, unless having a knowledge of the tidal streams, to take a sailing vessel through the strait without a pilot, especially at night.

Directions.—A vessel entering the Strait of Messina from the northwestward should, to clear Modeste Shoal (Secca Rasocolmo) (see p. 579) keep Capo Peloro Lighthouse bearing southward of 129° , and may round the lighthouse at a distance of 800 yards and in not less than 20 or 30 fathoms water, carefully checking the distance by bearings of Scilla and Punta Pezzo or by angles of elevation of the lighthouse.

From the northward, a sailing vessel bound through the strait with a good breeze and southerly current, should take the middle of the channel and when abreast Capo Peloro steer for Messina; but on arriving on the line between Punto Pezzo and Pace alter course for Punta Pellarò and approach the coast of Calabria, where the tidal stream is more favorable; when off Reggio keep in the middle of the channel and the strait will be cleared without difficulty.

With a northerly wind and a northerly current get into the counter stream of Alta Fiumara, northward of Cannitello Village, with the assistance of which Punta Pezzo will be reached without difficulty; thence steer toward Pace and then for Punta Secca Lighthouse of Messina; when opposite the convent of San Salvatore di Greci keep for Reggio, where the current will be weaker.

With the wind and current both southward, after reaching the counter stream on the ebb, tack toward the coast of Sicily, and tack again before entering the eddy off Pace; another tack will take the vessel off Cantona, but do not approach the land on account of the countercurrent; then stand toward Messina and at a reasonable distance from it tack; on this tack toward Pentimele the land may be approached, as there is no northerly eddy.

Continue to work to windward by making tacks toward Sicily a little beyond the middle of the channel, and those toward Calabria nearer the land; after passing Capo Scaletta, the next tack will take the vessel to Punta Pellaro, but should she fall to leeward of it, the land should not be approached on account of the countercurrent, but the cape once passed the tacks may be continued closer in to the land.

Bound southward, when the wind and tide are both contrary, it is best to reduce sail and keep off the north coast of Sicily between Capo Rasocolmo and Mondello fishing village, so as to be at the entrance of the strait at the moment of the turn of the tide; or anchorage may be taken up on the Faro Bank to await the change.

From the southward.—If from the southward, with a fair wind and current, a vessel should keep nearly in mid-channel, borrowing toward the Sicilian coast; when abreast of Messina steer for Capo Peloro, and when off Punta Pezzo keep a little more to the eastward toward Palmi to avoid the counter flood southward of the two coasts, then keep more to the northward and when clear of the shoal water off Capo Peloro, steer for Stromboli.

When off Punta Pellaro, with the wind south and the current running to the southward, keep along the coast of Sicily at the distance of a little more than 200 yards, to profit by the eddy which runs to the northward; when nearly up to Messina stand over for the coast of Calabria, get into the counter stream of Acciarello, and keep along shore as far as Punta Pezzo; if the southerly stream is still strong it will be necessary to approach again the coast of Sicily toward Canzirri, where the tide will be found favorable; but should it be weak, a course can be made direct for Capo Peloro and thence out of the strait.

With the wind and current north, work to windward on the coast of Calabria as far as Torre Lupo below Reggio; from there make a tack for the opposite coast and continue upon that side, making the offshore tack to about the middle of the channel, and the other near the coast: when abreast of Messina stand farther over to Calabria and work up as upon the opposite side for Punta Pezzo; when abreast of it, work in mid-channel to avoid the eddies; if, however, Canzirri can be reached on one tack, keep in to Torre Palazzo, standing off to

the middle of the channel and keeping a little off the tower when standing in.

Once to the northward of the shoal off Capo Peloro, a vessel can get to windward by making a short tack toward the Sicilian coast and a long one toward Calabria if the weather be fine, thus allowing the land breeze, which gets up in the evening, to be taken advantage of. But should the weather be bad the long tacks should be made toward the coast of Sicily, always remembering to keep clear of Modeste Bank.

When near Punta Pellaro, with a northerly wind, the ebb or southerly current, work in the bay northward of it, to take advantage of the countercurrent; from Torre Lupo, keep over on the coast of Sicily, and there work to windward, tacking when in mid-channel; when off the Fiumara di Don Brasco, near the south of Messina, cross to the coast of Calabria for the Acciarello eddy, working to windward to Punta Pezzo; from there stretch over as far as the Sicilian coast, but should the current be too strong and the breeze too weak to reach it, heave-to in the favorable eddy, and await the turn of tide; when Pace can be reached, work in the countercurrent as far as Capo Pelero, and continue the route as before directed.

Approaching the strait at night, if from the southward, the light on Capo dell' Armi is visible about 16 miles, and that on Punta Pezzo a distance of 13 miles; if from the northward, the light on Capo Peloro at about 14 miles, San Ranieri, 20 miles, and that at Scilla 16 miles.

Caution.—Strangers passing Milazzo Lighthouse, and bound to Messina, in thick or blowing weather, may be mistaken with respect to the entrance of the strait, as there is more the appearance of a strait southward of Vaticano than at the actual opening, and the error has proved fatal to many vessels.

Lipari or Æolian Islands.—The group consists of seven principal islands, viz, Stromboli, Panaria, Salina, Lipari, Vulcano, Filicudi, and Alicudi, with several islets and rocks. They are all irregular in outline, and comprise with Ustica a coast line of 77 miles; they are mountainous and all of evident volcanic origin, with distinct craters on several, two of which are active.

Ustica (the ancient Osteodes) is situated in approximately latitude $38^{\circ} 43' N.$, longitude $13^{\circ} 12' E.$, 55 miles to the west-northwestward of Alicudi, and 36 miles northeastward of Capo San Vito, in Sicily, and lying, as it does, somewhat in the track of vessels from the westward, it forms an excellent mark for those bound to Palermo and the north coast of Sicily.

Ustica is high in the middle, but at a distance of 20 miles eastward or westward, it appears as two small islands.

It is $2\frac{1}{2}$ miles in length, in an east-northeastward and west-southwestward direction, and about $1\frac{1}{2}$ miles in breadth, and is entirely composed of volcanic substances, but is extremely fertile, and well cultivated, and has a population of about 1,900. On several parts of the coast there are spacious grottoes, with deep water in them, of which one on the eastern side has a singular stalagmitic incrustation of shells intermixed with lava. Another near it, with a very low entrance, is so roomy within that in former times fishermen have sought security in it from the Barbary cruisers. Torre del Spalmatore, a square tower, commands a landing place at the southwestern end of the island.

In the vicinity of the coasts, the water is generally deep, a depth of 30 fathoms being found at 100 yards distant; and in some parts nearer.

Off the western side of the island, $1\frac{1}{2}$ miles distant, is Secca d'Apollo, having depths of 17 to 26 fathoms, over coral.

Lights.—On Punta Uomo-Morto, on the northern side of Capo Falconara, a white turret, 23 feet in height, and with a dwelling adjoining, exhibits, at an elevation of 328 feet above the sea, a flashing white light visible 22 miles. (For arc of visibility, see Light List and chart.)

Auxiliary light.—A fixed red light, visible 4 miles over an arc of 41° , covering Columbia Shoal, has been installed in Uomo Morto Point Light Tower.

On Punta Gavazzi, the southwestern extremity of the island, a white tower, 92 feet in height, and with a dwelling adjoining, exhibits, at an elevation of 131 feet above the sea, a fixed and flashing white light, visible 10 miles. (For arc of visibility, see Light List and chart.)

Signal station—Semaphore.—On Monte Guardia dei Turchi is a semaphore, with which vessels can communicate.

Storm signals.—Storm signals are also made at the signal station.

Dangers.—**Scoglio il Medico**, nearly 600 yards northwestward of Punta di Megna on the northwestern side of the island, and nearly abreast the steep cliffy cove of Madonna della Croce, is a large and singular islet or rock of lava, having ledges extending from its southwestern and northeastern sides.

Secca di Colombara (Walker Rock), 1,100 yards northward of Testa del Russo (Punta Gorgo Salato), the northern point of Ustica, is a bed of sunken rocks, about 200 yards in extent, with 6 feet water on them and 14 fathoms close around. Torre del Spalmatore, seen over Punta di Megna, bearing 201° , leads westward of Secca di Colombara.

Secca di Colombara is covered by the auxiliary fixed red light from Punta Uomo Morto Lighthouse.

Submarine telegraph cable.—A submarine telegraph cable is laid from Ustica to Palermo. The cable house (with the inscription "Cavo sottomarino") is situated about 22 yards from the sea in Cala di Santa Maria. Two white frame balls indicate the direction of the inshore portion of about 200 yards of the telegraph cable to Palermo, which then trends in a southerly direction.

On the seaward side of the cable house a notice prohibiting anchorage, etc., is affixed.

NOTE.—The cable from Naples to Palermo is laid direct and not via Ustica as formerly.

Anchorage.—The anchorage is in from 4 to $4\frac{1}{2}$ fathoms water, over sand and weeds, about 100 yards from the shore and westward of the line of telegraph cable; the telegraph cable is clear of the usual anchorage, but vessels must not anchor with the two white balls marking the direction of the cable in line.

There is good anchorage, with southwesterly winds, between Cape Falconara and Punta Gorgo Salato in 12 to 14 fathoms, with Cape Falconara just shut in behind Punta Uomo Morto and the semaphore bearing 235° .

Town.—The only town is Santa Maria, above the sandy beach at the head of a little cove, on the eastern side of the island; it is clean, with regular streets, a church, hospital, schools, etc. The cove is about 200 yards wide and the same deep, with 5 fathoms water in the middle, and is sufficiently large for the small trading vessels which resort to it; it is safe with all winds but the scirocco. On the northern side of the cove is Collina di Falconara, with an old fort on its summit; and on the hill on the southern side is a conspicuous square tower and a windmill.

Ustica has a numerous colony of convicts and a company of soldiers to look after them.

Communication.—There is a steamer twice every week to Palermo, and telegraphic communication at limited hours.

Supplies.—A small quantity of fresh provisions and water may be procured.

Alicudi (ancient Ericusa), the western of the Lipari group, is about $4\frac{1}{2}$ miles in circumference, and rises abruptly as a conical crater, 2,172 feet above the sea, with irregular ravines and precipitous hills; and although its fires have been extinct for many ages, lava is seen in wild grotesque streams from the summit to the sea, so harsh and durable as still to retain the sterile, forbidding appearance of a recent eruption.

Notwithstanding this discouraging aspect, Alicudi is well cultivated in every place capable of vegetation; and particularly between all the interstices of the shattered masses, where, by constant exertion, barilla, flax, capers, pulse, and excellent wheat are produced.

The population is about 1,000. The church, which is on the south-eastern side, is so high, and the land beneath is so steep, that a view from it is like looking from the masthead of a vessel.

Communication.—There is a steamer every fortnight to Filicudi, Lipari, and Messina.

Supplies.—Fresh provisions and water are very scarce.

Landing.—The coasts of Alicudi consist of craggy precipices, among which are two small but insecure landing places, of which the one to the southeastward under Punta Palumba is the better, and here the fishermen haul their boats up on a patch of sand; the other is in a small cove, on the northeastern side; but both are difficult of access in fresh breezes; within $\frac{1}{2}$ mile of the coast the depth of water is more than 150 fathoms.

Filicudi (ancient Phœnicusa), situated $8\frac{1}{2}$ miles eastward of Alicudi, is an extinct volcano with three high summits, but except a spring of hot sulphureous water, there are no remains of fire, nor does history record any eruption of it. The island is 3 miles in length in a northwestern and southeastern direction, nearly $1\frac{3}{4}$ miles in breadth, with a coastline of 8 miles, and 2,598 feet above the sea.

Its coasts are rugged and broken, and exhibit grand masses of basaltiform lava. On the western coast, between two small projecting points, is a remarkable grotto, which may well be imagined to have given the idea of the caves of Æolus. A perforation upwards of 60 feet wide and 30 feet high, through which a boat can pass, forms the entrance to a natural colonnade, and widens gradually into an extensive hall with spacious arches. This magnificent cavern is about 160 feet long, 120 broad, and 50 in height, and forms a cool retreat in which seals have occasionally been seen.

The southeastern end of the island is a small peninsula, 371 feet above the sea, and of a conical shape, connected to the main island by a low and fertile isthmus, which forms a bay on each side. From the northeastern end a steep and intricate path leads to the church and principal houses. The population is about 800; they are said to be hardy, industrious, healthful, and peaceable. The houses are flat roofed, built on the isthmus and on the side of the hills.

Anchorage.—Small vessels anchor close to the shore either northward or southward of the isthmus and secure to the rocks.

Dangers—La Canna.—Lying 1,200 yards west-northwestward from Punta Notaro, on the northwestern side of the island are two rocks, Monte Nassa and La Canna; the latter is a slender rock, 280 feet high, and has frequently been mistaken, at a little distance, for a sailing vessel before the wind; rocks and shoal water extend $\frac{1}{4}$ mile west and southwestward, and there are several rocks about fringing the coast of the island, with deep water between them and La Canna.

A small shoal, with $3\frac{1}{2}$ fathoms water over it, lies 1,200 yards east-

northeastward of Punta della Carestia, the northwestern part of the island, and there is a depth of 9 fathoms about midway.

A shoal, with 6 feet water over it, lies about 200 yards off the northeastern part of Capo Graziano, and with the above exceptions the island is steep-to, but skirted here and there, close in, with a few rocks.

Above 1 mile northwestward of La Canna is Secca di Filicudi, a bank of 21 fathoms, with 85 fathoms between, and from 100 to 200 fathoms $\frac{1}{2}$ mile off.

Communication.—The steamer running between Alicudi and Lipari calls every fortnight.

Water.—Rainwater is preserved in cisterns, there being no fresh water on the island.

Trade.—Filicudi is well cultivated, and produces wheat, barley, grapes, olives, pulse, and flax; cattle and fruit are exported, and there is a small coral and sponge fishery.

Salina, $9\frac{1}{2}$ miles eastward of Filicudi, is 4 miles long in a north-westerly and southeasterly direction, and nearly 3 miles at its broadest part, with a circumference of $11\frac{1}{2}$ miles. Its ancient name was Didyme, or Twins, from the appearance of the two high conical summits that distinguish the island; it possesses several warm springs, and remains of the ancient baths still exist on its western side. The population is about 5,000.

The origin of the island seems to have been altogether volcanic, vestiges of its craters may still be seen, but the fires must have ceased before the dawn of history, and they have now become the most pleasing and fertile spots in the whole group of the islands. Between Monte Porri (2,850 feet high), to the westward, and Monte San Salvatore (3,125 feet high), to the southeastward, the valley extends each way to the sea, and is so rich and productive as to merit its name of Fossa Felice, or Happy Valley; and here the various trees bear with such exuberant luxuriance that the natives say the earth is proud of its vigor.

Light.—A fixed white light is exhibited, at an elevation of 174 feet above the sea, from a light yellow octagonal tower, 30 feet in height, and situated on Lo Capo, the northeastern extremity of the island; it is visible 19 miles. (For arc of visibility, see Light List and chart.)

Coasts.—The southeastern end of the island is a low shingle point named La Lingua; here are the salines, whence the island derives its present name. Shoal water extends nearly 400 yards from the point. About midway along the southwestern side of the island is the village and church of Rinella, whence a road leads through the valley to La Malfa, and another to Santa Marina.

The northwest coast is abrupt and singular from its stupendous overhanging cliffs, and near its northwest point is a high, red, pyramidal rock, named Faraglione. The hills abound with various game, and form a pleasing amphitheater, inclosing a fertile, cultivated valley. The northwestern extremity of the island is a remarkable perforated point, between which and the northeastern extremity is a populous district and well-wooded heights; the town and church of La Malfa is about midway between.

On the north coast there is excellent fishing, and the Pinna Marina, a gigantic kind of mussel, termed by the ancients the silkworm of the sea, is found in abundance about the island, with its curious attendant crab. The Paper nautilus is also found here, generally during the time that hawk's-bill turtle are taken.

Submarine telegraph cable.—A telegraph cable connects Salina with Lipari.

Anchorage.—There are several anchorages, where small vessels load with the produce of the island; northward of Punta Lingua, in depths of from 19 to 22 fathoms, about 300 yards from the shore, or at 150 yards distant, in 6 fathoms water, also southward of the point, in about 8 fathoms water at 200 yards distant, off Rinella, in 14 fathoms water, over sand, and in the same depth and over a similar bottom between Faraglione and Punta Perciato.

Towns.—Santa Marina, near the middle of the east coast, is the principal town of the island, and may be recognized by a church with a large white cupola. The other towns are La Malfa on the north, Pollara on the west, and Rinella on the south coasts; each has a church surrounded by low, flat-roofed houses.

Communication.—There is a steamer daily to Milazzo and Lipari and steamers frequently to the other islands of the group; telegraphic communication with all parts at limited hours.

Supplies.—Moderate supplies of fresh provisions may be obtained; water is procured from a private cistern; there is a spring of good water constantly running near Santa Marina Church, and it may be found by digging anywhere on the beach.

Trade.—In consequence of this fertility, an excellent revenue is derived from the exportation of grain, fruit, pulse, capers, salt, alum, soda, and wines, of which last the fine Malvasia is unrivaled.

Secca di Capo.—A shoal with $4\frac{1}{2}$ fathoms over, and deep water around it lies northeastward, distant 3 miles from Lo Capo Lighthouse. It was formerly named Penrose Shoal, but it now appears on the chart as the Secca di Capo. It is covered with marine plants and abounds in fish, and is much frequented by fishermen.

Deep water surrounds Salina, and between it and Lipari there is a depth of more than 170 fathoms.

Lipari, formerly named Lipara, the principal island of the *Æolian* Group and separated from Salina by a channel $2\frac{1}{4}$ miles wide, is $5\frac{1}{2}$ miles in length in a north and south direction and 4 miles in breadth, having a coast line of $16\frac{1}{2}$ miles. The chief features of the island are the two mountains, Sant' Angelo, 1,946 feet high, near the center, and Monte della Guardia, 1,211 feet high, on the south.

The interior of the country is singularly rugged and broken, with sterile hills of volcanic glass, porphyritic lava, pumice, and other vitrifications, many of which must be more than 3,000 years old and yet exhibit no symptoms of decomposition. Between the hills are deep valleys or ravines, apparently worn through by the action of heavy rains, and along these the roads lead (often only from 5 to 10 feet wide) between cliffs of a frightful height and aspect. The population of the island is about 15,400.

East coast.—The land forming Monte Rosa projects 1 mile eastward from the general line of coast, and on its northern side, at the head of a bay, is the village of Canneto, prettily situated southward of the white cliffs of an enormous mass of pumice, named Campo Bianco, which terminates in Punta della Castagna, the northern extremity of the island.

Anchorage, locally known as Le Oncie, may be obtained off the village in 8 or 9 fathoms water, over weeds, about 200 yards from the shore, avoiding the telegraph cable; the prohibited anchorage is pointed out by a tablet situated about 200 yards southward of the church in the center of the village.

North coast.—Between Punta della Castagna and Punta del Legno Nero, the northwestern extremity of the island, is the village of Acqua Calda, and on a hill above the village is the town and church of Quattrà Pani, and over it Monte Chirien, 1,975 feet above the sea.

Anchorage, sheltered from southerly winds, but otherwise exposed, may be obtained off Acqua Calda; a notice points out the prohibited anchorage on account of the telegraph cable.

West coast.—From Punta del Legno Nero, the coast to the southward is a steep cliff; at $\frac{3}{4}$ mile beyond the point and not far from the shore, is a high bold rock named Toricello (Scoglio Immeruta), and about $1\frac{3}{4}$ miles farther on are Pietra Piramida. A few steps and a winding path permit a landing at a tower just southward of Pietra Piramida; the tower is constructed of the finest lithologic specimens in the island and stands at the end of a valley where there are some ancient caverns and other natural curiosities.

Secca di Bagno.—Pietra del Bagno, situated 1.1 miles southward of Pietra Piramida and about $\frac{1}{4}$ mile from the shore, is a steep mass of lava, and nearly halfway between is another, with a shoal to the westward of it. From Pietra del Bagno the coast of Lipari trends

to the southeastward, forming a bight and one or two little bays to Punta Capparo (della Crepazza), the southern extremity of the island.

Secca di Bagno, a ledge, 200 yards in extent, with a depth of 8 fathoms over and deep water around it, lies nearly 1 mile south-eastward of Pietra del Bagno; from it Pietra Lunga is just open northward of Vulcanello, bearing 122° . The bank is a good place for fish.

A little to the westward of the southern end of the island are two remarkable rocks, of which the northeastern, named Pietra Lunga, is a heap of volcanic laminæ in a highly vitrified state, 150 feet above the sea, with an aperture at its base through which boats may pass, appearing at a little distance like a vessel under sail. The other rock, Pietra Menalda, is much lower and abounds in a kind of large gull, prized by the natives.

To the northward of these rocks, distant about 700 yards, are other isolated rocks named Scogli della Formiche. There is anchorage in 12 to 15 fathoms, sand, in a bay about 1 mile northwestward of Scoglio Formiche on the line between Punta San Jacopo, the south-eastern point of the bay, and Punta delle Fontanelle (Grotticelle), the northwestern point, which may be recognized by its caves and yellow and red rocks, with Scoglio Formiche in line with Pietra Lunga. A mile to the northeastward of Punta Capparo is Punta San Francesco, of rugged lava, forming the southern extremity of Rada di Lipari.

Rada di Lipari, on the southeastern side of the island, is bounded on the north by the promontory of Monte Rosa, which is an immense mass of volcanic matter of a reddish color, and on the south by Punta di San Giuseppe, forming a bight about $1\frac{1}{4}$ miles wide and $\frac{3}{4}$ mile deep, but the available space for anchorage is very small on account of the great depth of water.

Lights.—At Pignataro, northeastward of Lipari, an occulting red light is shown at an elevation of 126 feet above the sea from an iron support on a small tower on top of a house with a red front and 22 feet in height; it is visible 6 miles. (For arc of visibility, see Light list and chart.)

A fixed green light with white sector, visible 3 miles, and exhibited from a cast-iron pillar, has been established at Marina Corta, located on a small bank about 1,760 yards 193° from the occulting red light at Pignataro. The light is exhibited 20 feet above the sea from an iron column.

Mooring buoys.—There is a mooring buoy, in 25 fathoms water, about 200 yards northeastward of Punta Scaliddi and another in about 33 fathoms 405 yards 154° from the occulting red light at Pignataro.

Anchorage.—The water off the town is very deep, there being from 30 to 50 fathoms close in, except in front of the beach northward of the town, where there is a reef with $3\frac{1}{2}$ fathoms water over it, between which and the castle small vessels lie with anchors in 12 or 14 fathoms water, and stern fasts to the shore. The small craft of the island moor southward of the castle, off the pratique office mole, and fishing boats are hauled on the beach in the cove a little farther southward. At the head of the bight is the anchorage of Casa Bianca, which may be used by large vessels; the bottom is good, but the anchorage is exposed to southeasterly winds. A notice board points out the anchorage prohibited on account of the telegraph cable.

Town.—The town of Lipari stands on a steep declivity on the southern side of the bay; it is crowded, irregular, and dirty, with narrow streets and ruinous public edifices, of which last the finest are the Capuchin Convent, a hospital, a nunnery, and the bishop's palace. The castle, which incloses the cathedral and some other edifices, is erected in a commanding situation on the summit of a huge volcanic rock. There is a college, and under its superintendence are several schools in different parts of the islands. The population is about 15,400. Lipari is a penal settlement; about 400 convicts are generally stationed there.

Communication.—Steamers run daily to Milazzo and Salina; twice a week to Messina and Stromboli; and fortnightly to Filicudi; there are also frequently steamers to Naples; telegraphic communication with all parts. The telegraph office is open till 9 p. m.

Supplies of fresh provisions in very limited quantities may be procured, and water is scarce, every house having its own cistern.

Hospitals.—There is a civil and a military hospital.

Trade.—Two large but unequal plains are well cultivated, producing fine fruit, cotton, pulse, olives, and vegetables, besides a three months' supply of corn for the island. The malmsey wine from these plains is well known for its delicious flavor. Lipari has an active trade with the other islands, also with Messina, Palermo, Naples, etc. The principal exports are ground pumice stone, cloth, wine, fruit, and vegetables.

Submarine telegraph cables are laid from Lipari to Salina, Vulcano, and Panaria.

Vulcano (ancient Hiera or Vulcania), lying about 800 yards to the southward of Lipari, is $4\frac{1}{2}$ miles in length, 2 miles in breadth, with an irregular outline of 14 miles, and is elevated 1,601 feet above the sea. It is wonderfully marked by volcanic action, and contains a variety of pumices, salts, and sulphur in all its different states, with lavas and vitrifications. The interior is mostly a sterile valley of powdered cinders, much too warm for cultivation. A large por-

tion of the eastern coast is a precipitous mass of lava, scorix, pumice, and ashes, of the most sterile and forbidding aspect.

Near the western side of the island is Monte Saraceno, the highest part of the island, and 1 mile northward of it is Solfatare, the great active crater, which is separated from the neighboring hills by a deep valley.

Monte Vulcanello, the northern part of the island, forms a peninsula, and is connected to the main portion by a low, rocky formation of its own lava, with a bay on each side. This piece of land is said to have emerged from the sea about 180 years B. C.; it has two craters, neither of them large; one is extinct and fast filling up, but from the other a rumbling noise is sometimes heard and it frequently emits smoke.

The southern coasts of the island yield grapes, flax, barilla, vegetables, pulse, and fruit, and the best corn in the islands, except that of Alicudi. As the land rises to the acclivity of the mountain, a slight vegetation of lichens and dwarf shrubs affords food to several large flocks of goats. There is a spring of good water about the middle of this ground. On Punta Santa Rosario, about 700 yards westward of the present lighthouse, is the old lighthouse, about 460 feet above the sea.

Light.—On Punta Praia dei Porci, south coast of Vulcano, an octagonal tower, surmounting a dwelling, 134 feet in height exhibits, at an elevation of 148 feet above the sea, a flashing white light. It is visible 18 miles. (For arc of visibility, see Light list and chart.)

Submarine telegraph cable.—A telegraph cable connects Vulcano and Lipari.

Anchorage.—The western bay of Vulcanello, or Porto di Ponente, is picturesque, and affords anchorage for small vessels in $2\frac{1}{2}$ fathoms water, over black sand, but it is exposed to northwest winds which in winter gales send in a heavy sea. There is a rock on the western side of the entrance. One mile westward of the port is Capo Grosso, an abrupt mass of lava with 10 fathoms water close to it. Between this point and that of Monaco is a cove, with a rock in the center, resorted to by fishermen during scirocco or southerly winds. Thence the coast southward is irregular, bold, and craggy. At $1\frac{1}{2}$ miles beyond Punta Monaco is a steep, detached rock with deep water between it and the land.

When a northwest wind sets into Porto di Ponente a vessel can easily shift round to Porto di Levante, on the eastern side of Vulcanello, where she can lie in security nearly under the small crater. In this bay are a few cottages and a chapel. At the anchorage in the eastern bay internal rumblings like distant thunder may be heard, and on these occasions the clouds arise from the great crater with greater activity and density.

Soundings.—Deep water surrounds both Vulcano and Lipari; above 1 mile northward of the latter there is a depth of 26 fathoms, with a bottom of rock and coral; between it and the shore there is a depth of above 70 fathoms, and off the eastern side of the islands, and to the south and west of Vulcano there are from 200 to 300 fathoms, at about 1 mile off. There are the same depths westward of Secca di Bagno, decreasing toward the passage of Salina.

The channel between Lipari and Vulcano is 800 yards wide, and has from 13 to 25 fathoms water in midchannel.

Panaria (ancient Euonymus) lies east-northeastward, distant $9\frac{1}{2}$ miles from the northeastern point of Salina, is $1\frac{1}{2}$ miles in length in a northeastern and southwestern direction, 1 mile in breadth, and 1,430 feet above the sea; its form is oval, with a coast of $4\frac{1}{2}$ miles in circuit. The island had warm baths named Thermisia by the Romans, and the numerous vestiges prove it to have been a place of consideration; it has a population of about 1,000.

The soil is rich and well cultivated, particularly on the east side, and produces wheat, barley, fruit, oil, wine, pulse, and soda. Fishing is a profitable employment. There is a church and village on the eastern coast, and on the southeastern side of the island a chapel and a small bay with a beach of yellow sand, the only sand of the kind in all the islands.

The coast around Panaria is bold; Scoglio della Nave lies a short distance off the northern end, and round to the westward, at 1 mile from the shore, the depth is over 60 fathoms.

Communication.—There is telegraphic communication with all parts at limited hours.

Supplies.—A number of cattle are bred on the island, and fresh provisions may be procured in small quantities, also a very limited supply of water from cisterns; there is a mineral spring near San Pietro church.

Submarine telegraph cables are laid to Lipari and to Stromboli.

Scoglio Formiche, nearly awash, lies nearly $\frac{1}{2}$ mile off the center of the eastern side of the island, or 1 mile eastward from Punta Milazzese, its southern point.

Anchorage.—Vessels may anchor either northward or southward of Scoglio Formiche in from 10 to 15 fathoms water, over good holding ground, but must be prepared in winter for onshore winds. Small vessels find snug anchorage in the sandy bay before-named.

Basiluzzo.—About 2 miles to the eastward and northeastward of Panaria is a cluster of islets and rocks; the northeasternmost and largest of which, named Basiluzzo, about 1 mile in circumference, is shaped like a wedge with steep sides on the westward. Off its western side is Spinazzola, an islet with a tabled surface, tolerably culti-

vated, producing corn, flax, and vegetables, and having on it vestiges of ancient buildings.

Dattilo, about 1 mile eastward of Panaria, is a white steep rock of lava, in a state of partial decomposition. In this curious mass there are many little cavities, in which the inhabitants of Panaria place their rude but profitable beehives; the channel between Dattilo and Panaria has from 20 to 30 fathoms in it.

Close to the northeastward of Dattilo is a cluster of black rocks, named Panarelli; and beyond them, $\frac{1}{2}$ mile from Dattilo, is a rocky shoal on which is $2\frac{3}{4}$ fathoms water.

Lisca Bianca is a rocky islet of a light color, about $1\frac{1}{4}$ miles eastward of Panaria, and though small is partially cultivated. On its southwest are Bottaro and Lisca Nera, islets with shallow water between and around them. Between Lisca Bianca and the islet next to the southwestward, Capt. Smyth, in April, 1815, found a strong smell of sulphur, and in two places were springs of sulphureous gas, the bubbles of which rose in quick and constant succession to the surface, and where they have been known to flame on bursting into the atmospheric air. Rocks with 3 feet water on them lie about 350 yards to the southeastward of Lisca Nera.

Secca dei Pesci, a rocky bank with from 17 to 30 fathoms water over it, lies southeastward, distant 3 miles from Punta Milazzese, Panaria.

Stromboli, the ancient Strongyle, and the northeastern island of the Æolian group, lies 10 miles northeastward of Panaria, or $7\frac{1}{4}$ miles from Basiluzzo. It is about 8 miles in circumference, conical, and rises 3,035 feet above the sea, and from every indication seems to be the entire product of subterranean fires. The crater, which faces the northwest, is about one-third down the side of the mountain, and continually burning, with frequent explosions, and a constant ejection of fiery matter; it is of a circular form, and about 170 yards in diameter.

Even with this stupendous volcano existing, Stromboli is extremely fertile, having a fine verdure in the cultivated parts, and these, on one side, extend high up the mountain. The soil is a black mould, composed of argillaceous tufa, scoriæ, pozzolana, and sand. The hedges are of cane reeds, which when sufficiently strong are cut down, and used as supporters for the vines. The products are some of the finest wines in the Mediterranean, and a moderate quantity of wheat, barley, cotton, raisins, currants, and figs; the population is about 4,000.

Anchorage.—Temporary anchorage, in a depth of 12 fathoms, can be found in the channel between Stromboli and Strombolicchio.

Towns.—There are three towns or villages, viz, San Vincenzo,

at the northeastern extremity of the island; San Bartolomeo on the north coast; and Ginostra on the southwestern side. The houses are generally low, with flat roofs, though there are a few of two stories, and even vestiges of ancient buildings and sepulchers may still be seen. San Vincenzo is the most important town and the beach below the houses is a black shining sand, terminating in a rocky point, where there is a large cavern, named the Grotta delle Bovi Marini, or seal's cave, which is 86 feet long, 35 feet at the entrance, and 7 feet high.

Communication.—Steamers from Messina and Lipari call weekly and fortnightly, respectively. Telegraphic communication with all parts at limited hours.

Supplies.—Moderate supplies of fresh provisions and water may be procured, the latter being purchased from private cisterns.

Submarine telegraph cables.—Stromboli is connected with Panaria by a telegraph cable.

Coasts.—The northern extremity of the island is formed of rugged lava and a little to the southwestward of it there are some rocks awash, but close in. The northwestern side of the island forms a slight bay, where, immediately under the crater, incessant showers of red-hot stones from the volcano frequently fall. The western coast of the island is of rugged lava, and here will be seen the village of Ginostra, with a few houses and a church.

Punta del Monaco, the southern extremity, is a low shingle point, and along the coast thence to San Vincenzo there are several caves. One of these a little way up the hill above Punta del Uomo, is remarkable as the place where the bright and beautiful mineral named specular iron is found. There are no outlying hidden dangers around the island, and except at the northeastern extremity the water is everywhere deep close in. There is a depth of from 100 to 200 fathoms within $\frac{1}{2}$ mile of the coast.

Strombolicchio, about 1,800 yards northeastward of Punta della Lena, the northeastern point of Stromboli, is a steep rock or mass of indurated pozzolana, 164 feet above the sea, which appears from a distance like a ship with studding sails set. There are from 7 to 35 fathoms water between it and Stromboli.

Current.—In the channel between Stromboli and Basiluzzo a current setting to the westward at the rate of 1 mile an hour has been experienced, a moderate northeasterly breeze blowing at the time.

North Coast of Sicily.—The north coast of Sicily is generally free from hidden danger; the prevailing winds are between southwest and northwest, and are preceded by a swell; the gales, when they occur, blowing home. During fine weather, the current usually sets to the westward at the rate of $\frac{1}{4}$ to $\frac{3}{4}$ knot an hour, and is stronger

near the shore than in the offing; at other times the current is much influenced by the wind.

Coast.—From Capo Peloro, the north coast of Sicily as far as Capo Rasocolmo, $6\frac{1}{2}$ miles distant, is a sandy beach; at intervals there are towers and other buildings, and on the spur of a ridge over Pantano Piccolo is Spuria semaphore, already mentioned. These towers are erected at intervals on prominent points all round the coast, and were formerly for observation and defense; they are about 50 feet high, generally square, with turrets at the angles. Toward the western part of this coast are several rivulets, the chief of which is the Corsari. Acquarone Village is situated to the eastward of the entrance.

Modeste Bank.—For $1\frac{1}{2}$ miles from Capo Peloro the beach is bordered by a bank, at the distance of about 400 yards, but from the village of Mortelle, the edge of the bank trends in a north-northwestward direction, gradually increasing its distance from the shore to $1\frac{1}{2}$ miles. The general depths on the bank (except near the shore) are from $3\frac{1}{2}$ to 5 fathoms, but near the outer edge there are two patches with $2\frac{1}{2}$ and 3 fathoms water over them.

Modeste Shoal (Secca di Rasocolmo), the northern patch, with $2\frac{1}{2}$ fathoms water over it, is nearly 200 yards in extent, and lies 1.2 miles 58° from Acquarone Village. Along the edge of the bank outside these shoals there are depths of from 10 to 24 fathoms. Capo Peloro lighthouse bearing southward of 130° , or the lighthouse in range with Torre Cavallo (if visible) on the Calabrian coast, or, at night, Punta Mazzone light in sight leads to the northward of these dangers.

Anchorage.—Off the fishing village of Acquarone it is said there is good anchorage; $\frac{1}{2}$ mile to the northwestward there are 5 fathoms water, and at 1 mile in the same direction depths of from 12 to 20, over stiff muddy bottom; the position will be further identified by a high mound of white sand, a little eastward of the village.

Capo Rasocolmo, about $6\frac{1}{2}$ miles west-northwestward of Capo Peloro, is the eastern termination of fertile tableland of moderate elevation, with several sandhills under it, and some low rocks (Pietra del Rais) at its base; on the extremity of the point are the remains of a Saracenic tower. The steep shore is fronted by a margin of sand, and may be approached from the northward and westward to within $\frac{1}{2}$ mile, where a depth of 5 fathoms will be found; at 1 mile off, in the same direction, there are 26 fathoms; and at 4 miles, from 100 to 150 fathoms, over sand and mud.

Coast.—The range of hills, the foot of which recedes from the coast to the westward, as also near the outlet of some of the larger torrents, slopes from elevations of from 1,000 to 1,200 feet above the sea, and is broken by numerous watercourses and studded with

small towns and villages, around which is much rich and beautiful cultivation.

On the slope of the hill, $4\frac{1}{2}$ miles southwestward of Torre di Rasocolmo, is the town of Gesso. On the coast, about 8 miles from Capo Rasocolmo, is the beautifully situated town of Spadafora (Spadaforo San Martino), with its palace, and 2 miles westward is the large Torrente Nocito, about which is a quantity of marshy land, and the low ground increases hence to the peninsula; $2\frac{1}{2}$ miles farther is Torrente Santa Lucia (del Mela), whence a low, sandy coast curves for $1\frac{3}{4}$ miles to the neck of Penisola di Milazzo.

Communication.—There is a telegraph station at Spadafora.

Supplies.—Moderate supplies of fresh provisions may be procured; water is abundant but not very good.

Anchorage.—There is temporary anchorage off Spadafora old palace, in about 11 fathoms water, over sand and mud, at about 1,400 yards from the shore; a small vessel may go closer in with 3 fathoms about 700 to 800 yards from the shore.

Baia di Milazzo.—Penisola di Milazzo, which projects more than $3\frac{1}{2}$ miles to the northward, appears from a distance like an island, the isthmus connecting it with the mainland being low and level. The distance across the isthmus is about 700 yards; the peninsula is backed by Mount Ætna, and the high range of hills running along the northern side of Sicily. Baia di Milazzo is the bight on the southeastern side of the peninsula.

The citadel, 367 feet above the sea, on a rocky elevation at the south end; Monte Trino, 483 feet, a round, thickly-wooded hill in the middle; and the lighthouse, with several towers and a mill, show conspicuously above the rest of the land, which is level, thickly wooded with olive trees, and well cultivated, with vineyards. On a nearer approach the houses of the lower town on the eastern side of the isthmus and south of the citadel, the mole lighthouse, a high chimney southward of it, and the numerous towns and villages on the northern spurs of the Sicilian hills, come into view.

The coasts of the peninsula are steep, and in parts precipitous, the eastern side being thickly wooded, and, except where precipitous, carefully cultivated. On the north and west sides the coast is more rocky, rugged, and barren, but from Punta Fascina (del Tono), $\frac{1}{2}$ mile south of Monte Trino, a steep pebble beach, with deep water close-to, on which a heavy sea sets in with westerly winds, extends to the south-southwestward.

Light.—The lighthouse, near Capo Milazzo, at the northern extremity of the peninsula, and on an eminence slightly elevated above the surrounding land, is a white circular tower, 34 feet in height, and adjoining a dwelling; it exhibits, at an elevation of 294 feet above the sea, an alternating fixed white and flashing red light, visible 14 miles.

Beacon Rock (Croce di Mare) is the extreme rock of a ledge extending 40 yards from a point on the eastern side of the peninsula, immediately northward of the town. The rock is 4 feet above the sea, and has a small white building (shrine) on it, which shows clearly as the anchorage is approached.

Shoal.—A shoal with $4\frac{1}{2}$ fathoms over it lies on the southern side of the bay, about 500 yards from the shore, and 1,400 yards eastward of the entrance to the port.

Tunny fisheries.—Tunny nets are laid out during the season, from March to November, from the eastern coast of the peninsula, as follows:

From the northern part of the small bight southward of Beacon Rock, eastward, for a distance of 300 yards.

From Punta Belvedere, 1,600 yards northward of Beacon Rock, eastward, for a distance of 400 yards.

From Punta Ruolo (Punta Ponte delle Scale), eastward, for a distance of 600 yards.

The outer end of these nets is marked by day with a buoy surmounted by a cylindrical topmark with black and white stripes, and at night by a red light over a white light. (See Caution, p. 60.)

Anchorage.—An outer anchorage may be taken up in 16 fathoms water, over muddy bottom, about 300 yards northeastward of the north molehead. The sandy beach forming the shore from Milazzo eastward may be approached to a prudent distance, the 5-fathom curve being within $\frac{1}{4}$ mile of the shore, and from 25 to 30 fathoms at the distance of $\frac{1}{2}$ mile; the coast of the peninsula northward of Punta Belvedere should not be approached within 400 yards.

In the winter several torrents discharge their thick, muddy waters along the coast, but owing to the water being deep nearly close to, there is little or no shallow deposit at their mouths. The anchorage is well protected from all but northeasterly winds, which, however, do not blow home with much force, but the wind from the above quarter sends in a considerable sea, which is accompanied by an off-shore swell.

The appearance of the Marina, which is only 3 or 4 feet above the level of the sea, would suggest that no very heavy sea breaks against it.

A sailing vessel seeking shelter in a southwest gale may anchor in from 10 to 11 fathoms water, over sand, east-southeastward of Punta Battista (Mazza) with the lighthouse bearing 278° .

Current.—The current sets around the bay, from the eastward, past the mole and Beacon Rock, to the northward.

Port.—The port, near the southern end of the peninsula, is formed by a small mole, which projects about 400 yards to the southeastward

and about 100 yards in an easterly direction; it is also sheltered by a mole which extends in a 46° direction from the shore near Tonnara San Giovanni for a distance of 250 yards. This mole affords protection against the swell which rolls along the coast with strong northeastly winds.

Depths.—There is a depth of from 12 to 30 feet in the entrance to the port. In the port there is a general depth of from 20 to 30 feet, except in the southern corner, where a bank with from 3 to 10 feet over it extends from the elbow, formed by the south mole, into the harbor for a distance of about 250 yards.

Light.—A flashing green light is exhibited on the extremity of the north mole. The light is exhibited 23.4 feet above high water and visible 7 miles. The height of the structure from base to vane is 25½ feet.

Buoy.—A spherical iron buoy is moored in 22 fathoms water, 300 yards 27° from the mole lighthouse.

Mooring buoys.—About 400 yards 278° from the mole lighthouse is a red cask-shaped buoy for the use of the coastal line of steamers; there are also two other red mooring buoys in the port, one of which is moored (as shown on the chart) close to a 3-fathom shoal.

Submarine telegraph cable.—A telegraph cable is laid between Milazzo and the island of Lipari; its direction will be seen from the chart, and is also pointed out by a notice board, and vessels are prohibited from anchoring in its vicinity.

Town.—The town of Milazzo (ancient Mylæ) is divided into upper and lower towns, both of which are irregularly built; and though it has a number of large edifices, none of them are remarkable. The churches, with the exception of that of San Francesco, are generally mean, and the convents poor; the population is about 16,200.

The town is principally distinguished by its fortifications, being strong by nature and art, as besides the subordinate fortifications, the citadel, on the highest part of the southern end of the promontory, commands the town and port; beneath it is a spacious grotto, named the cave of Ulysses. In the summer months malaria prevails in the plains southward of the town.

Communication.—There is a daily service of steamers to Lipari, railroad communication with Palermo and Messina, and telegraphic communication with all parts. The telegraph office is open till midnight.

Coal and supplies.—About 3,000 tons of coal are usually kept in stock. Vessels are coaled at the wharf, alongside which there is a depth of 22 feet.

Supplies of fresh provisions are sufficient, and good water is supplied in tank boats.

Hospital.—There is a hospital, which admits strangers at a fixed charge.

Pilots may be obtained.

Trade.—The district of Milazzo produces grapes, wines, olives, olive and solfuro oil, oranges and lemons, and the tunny fishery is an important industry; the fish, when preserved in oil, being chiefly exported to Genoa. There are also several flour mills.

Six-fathom Rock, 600 yards 344° from Punta Mizzanisi (Gamba di Donna), the northwestern extremity of the cape, is a 6-fathom rocky patch, with deep water all around it; with this exception there are no dangers, and the shore may be approached to $\frac{1}{4}$ mile.

Baia Sant' Antonio, on the western side of Penisola Milazzo, affords well-sheltered anchorage, with easterly winds, in from 10 to 15 fathoms water, over sandy bottom. Close to the western extremity of the bay, and about 200 yards southward of Punta Mizzanisi, are Scogli Porcelli, the largest being 30 feet above the sea. The 10-fathom curve passes about 200 yards from Punta Mizzanisi, which, together with the rocks, may be rounded at an equal distance.

Within $\frac{1}{2}$ mile northward, and the same distance from both sides of the peninsula, the depths are about 50 fathoms over a bottom of sand and mud.

Tunny fisheries.—Tunny nets are laid out during the season, from March to November, in Baia Sant' Antonio, southward of the lighthouse, they extend about 200 yards in a southerly direction; nets are also laid out at 1,400 yards southward of Punta Fascina (del Tono), extending about 1,000 yards in a westerly direction.

The outer ends are marked by day with a buoy surmounted by a cylindrical topmark, with black and white stripes, and at night by a red light over a white light. (See Caution, p. 61.)

Golfo di Patti.—From Capo Milazzo Lighthouse, Capo Calavá, the next most northerly projection, lies westward, distant $15\frac{3}{4}$ miles; the indentation between, named Golfo di Patti, is 7 miles deep, and bold to the sandy shore upon the eastern side. It is divided by Capo Tindaro into two bays, Oliveri and Patti.

From the inner end of Penisola Milazzo to the village of Oliveri, is a steep shingly beach, fronted by deep water, and on which the sea breaks heavily during westerly gales. The coast is bordered by a fertile plain, which is broken by several torrents; slightly elevated, at distances of $1\frac{1}{2}$ and 2 miles, are the towns and villages of Meri, Barcellona, and Furnari.

Castroreale, the capital of the district, situated in a central position about $3\frac{1}{2}$ miles from the coast, and built on the summit of a wall-sided hill, 1,330 feet above the sea, is conspicuous from seaward, and appears in the midst of several sharp peaks. Upon the coast to the westward of this portion of the gulf are two towers, Forte and Con-

fone, besides fishing villages including that of Falcone, 1 mile eastward of Oliveri.

Communication.—There is a station at Barcellona, on the railroad between Messina and Palermo, and telegraphic communication.

Baia di Oliveri.—In Baia di Oliveri, which is protected by Capo Tindaro from the westward, there is excellent anchorage in about 15 fathoms water, over stiff mud, about $\frac{1}{4}$ mile from the shore; the best berth is with Castello di Oliveri in range with the western part of the village, bearing about 226° .

This anchorage may be advantageously resorted to by sailing vessels when obliged to bear up from the heavy westerly gales of winter, as it can always be fetched; whereas from the length of the promontory of Milazzo (exclusively of its being so much farther to leeward) vessels on rounding Capo Milazzo and being unable to fetch a proper berth to the eastward of the promontory have in consequence often been under the necessity of keeping away for the Strait of Messina.

Baia di Oliveri is in some degree sheltered by the Eolian Islands, and by Secca di Tindaro, from the northerly sea, but should be quitted directly the wind shifts to the eastward of north. The small fishing village of Oliveri, with a castle and a tunny factory, is situated at the head of the bay.

Tunny fishery.—Tunny nets are laid out during the season, from March to November, a little to the northward of Oliveri village; they extend about 1,600 yards from the shore in a northeastern direction. The outer end of the nets are marked by day with a buoy, surmounted by a cylindrical topmark, with black and white stripes, and at night by a red light over a white light. (See Caution, p. 61.)

Capo Tindaro.—From 1 mile beyond Oliveri the coast becomes high and cliffy to Capo Tindaro or Tyndaris, conspicuous $1\frac{1}{2}$ miles to the northwestward; upon a summit are some ancient vestiges, a monastery, 920 feet above the sea, and a tower near the extremity of the point.

Secca di Tindaro.—The outer part of this shoal extends eastward 1,200 yards from Capo Tindaro, and has depths of from 2 to 3 fathoms over sand. The sharp cone of Rocca Novara open eastward of the village of Falcone, bearing 158° , leads eastward of the shoal.

Porto Madonna is formed by a dry sand spit extending from the eastern side of Capo Tindaro. It consists of a basin about 60 yards in diameter, has a depth of 6 feet, and is thus only suitable for boats. Northeast gales are said to cause a temporary closing of the entrance.

The sands of Secca di Tindaro and Porto Madonna owe their formation to the currents that set past the cape. With northwesterly gales, the waters driven round the shores of Patti are charged with sand, which, meeting with the eddy from Oliveri, is deposited on the bank.

Baia di Patti.—Between Capo Tindaro and Capo Calavá, $6\frac{1}{2}$ miles to the northwestward, is Baia di Patti, the shore of which may be approached by the lead; the water is deep with regular soundings, over a bottom of sand and clay. Near the center of the bay $\frac{1}{2}$ mile north of the Fiumara Tinieto, is a large conical, brown rock, Pietra di Patti, 45 feet above the sea, with a rock awash, Scogli di Patti, 200 yards eastward of it.

The channel between the rocks and beach has a depth of 14 fathoms and affords summer anchorage. It is necessary, however, to sight the anchor every third or fourth day, as the sand is apt to bank up, particularly after a breeze.

La Marina di Patti is a large village consisting of a long stretch of houses on the seashore, and is a dependency of the town of Patti, which stands on an eminence at the base of a kind of mountainous amphitheater, in a picturesque country at the head of the bay, and contains a population of about 10,000. The town is tolerably well built, has the remains of a Norman castle, and a cathedral; there is a manufactory of earthenware, a fishery, and westward of the houses of La Marina a steam mill, which is a conspicuous red building with a large chimney.

Light.—At La Marina di Patti, and about 70 yards from the coast, a fixed red light is exhibited at an elevation of 17 feet above the sea from a white column 11 feet in height; it indicates the anchorage and is visible 3 miles.

Rock.—A rock awash lies $\frac{3}{4}$ mile to the northwestward of Patti Lighthouse and 150 yards from the shore.

Another rock, with 3 feet, is reported to lie near this rock awash and 67 yards from the shore.

Buoy.—A white mooring buoy lies in 8 fathoms water abreast the lighthouse for the use of the mail steamers.

Anchorage.—A vessel may anchor off any part of this coast in 10 fathoms water, over sand and mud. The soundings are regular, deepening gradually to 100 fathoms at 2 miles distant.

Communication.—There is a railroad station at Patti, on the line between Messina and Palermo, and telegraphic communication at limited hours.

A fine road leads from La Marina di Patti to pass among the hills, named Scala di Tindaro, on the summit of which are the remains of the ancient city of Tyndaris, and thence down the hill to the village of Oliveri.

Supplies of fresh provisions can only be obtained in small quantities, but an abundance of good water may be procured from a public fountain.

Capo Calavá, the western boundary of the Golfo di Patti, is a sharp, bold projection from a ridge, which at a distance of about

1 mile falls from Monte Pezzecatori, an elevation of 1,742 feet above the sea. A short distance off the cape and to the eastward are a few rocks above water, and on the western side is a sandy bay. The water deepens to 100 fathoms at $\frac{1}{2}$ mile distant.

Tunny fishery.—Tunny nets are laid out during the season, March to November, from the mouth of a torrent about 1 mile south-eastward of Capo Calavá; they extend for a distance of about 1,000 yards in a northeasterly direction. The outer end of the net is marked by day with a buoy surmounted by a cylindrical topmark with black and white stripes and at night by a red light over a white light. (See Caution, p. 61.)

Coast.—The coast between Capo Calavá and Capo Orlando, a distance of 8 miles, is high, broken by many torrents and streams; there is some well-cultivated ground and several villages on the coast, including that of Gioiosa Marea, $1\frac{1}{2}$ miles westward of the cape. About a third of the distance from Capo Calavá is Punta Piraino, upon which is Torre Ciavoli; a short distance within, on an elevation 1,365 feet above the sea, is the town of Piraino, exporting oil, wine, and corn.

Brolo castle and village is $1\frac{1}{4}$ miles farther westward, near a stream of the same name; the castle is a ruinous structure on a steep cliff in a fertile valley.

Scoglio di Brolo, about $\frac{1}{4}$ mile from the shore, abreast of the castle, is about 16 yards in circumference and 45 feet above the sea, with 9 fathoms water between it and the shore; but the passage should not be used, as there is a reef awash and a sandbank to the westward of the rock, about half way to the shore.

Punta di Testa di Monaco, 2 miles westward of Scoglio di Brolo, is fringed by rocks to a distance of 400 yards.

Anchorage.—In this locality good riding has been found even in winter; although it is exposed from northwest to northeast, the most troublesome winds are those from the southward, and they blow with great violence from the height on which stands the town of Piraino.

San Gregorio.—A short distance to the eastward of Capo Orlando are two small, projecting rocks, jutting out like moles, where small country vessels at times anchor. In the bight beyond it is the village of San Gregorio, a landing place for timber, with anchorage tolerably protected from westerly winds, but open to the northward. To the eastward the country is more mountainous but not less pleasing and fertile.

Naso.—The walled town of Naso stands on the site of the ancient Agathyrnum, a hill, 1,630 feet above the sea, about 3 miles to the southeastward of the cape, in a fine wooded neighborhood, with some

houses on the coast below it. The Fiumara di Naso, dry in summer, is crossed by two bridges.

Communication.—There is a railroad station at Naso, on the line between Messina and Palermo, and telegraphic communication.

Tunny fishery.—Tunny nets are laid out during the season, March to November, at San Gregorio, about 1,600 yards southeastward of Capo Orlando; they extend $1\frac{1}{2}$ miles in a northeasterly direction from the shore. The outer end of the nets are marked by day with a buoy, surmounted by a cylindrical topmark with black and white stripes, and at night by a red light over a white light. (See Caution, p. 61.)

Capo Orlando, 328 feet above the sea, is steep, rugged, and conical, with a church and old place of interment on it, resembling a castle. It terminates in rocks, and a dangerous reef, just above water, extends westward of it $\frac{1}{2}$ mile. Between the reef and beach the bottom is foul and affords no anchorage, and this locality is remarkable for sudden squalls and heavy swells. A small village lies near the coast a little westward of the cape.

Light.—On Capo Orlando a flashing white light is exhibited, at an elevation of 88 feet above the sea, from an octagonal-shaped tower surmounting a yellow dwelling, the whole being 35 feet in height, visible 12 miles.

Coast.—From Capo Orlando to the westward the coast is an extensive bold, sandy beach. A round peak, named Marco, about 3 miles to the southwestward of Capo Orlando, and 1,030 feet above the sea, is conspicuous.

The town of Sant' Agata di Militello, with a population of about 7,600, stands on the beach of a level, fertile country, and 7 miles southwestward of Capo Orlando, eastward $1\frac{1}{2}$ miles of it is the Fiumara Rosmarino, a beautiful torrent, the banks of which are covered with mulberries, oleanders, and myrtles. Higher up in its course are the remains of a massive Roman bridge. There are several other streams, and the towns of Rosmarino, San Marco d'Alunzio, and Frazzano are on the hills. Fiumara Rosmarino is $\frac{3}{4}$ mile broad at its mouth and is conspicuous.

Communication.—There is a railroad station at Sant' Agata di Militello, on the line between Messina and Palermo, and telegraphic communication at limited hours.

Supplies.—Ordinary supplies of fresh provisions may be procured.

Caution.—All the fertile plains on this part of the coast are much subject to miasma.

None of the streams afford water fit for drinking; they are all polluted by various causes, such as dye works, etc.

Caronia.—From Sant' Agata di Militello a coast of similar character continues for 9 miles in a westerly direction to the low, broad, projection lying between La Marina di Caronia and the river of the same name. The little town of Caronia is on the summit of a rugged hill, 990 feet above the sea; it lies on the skirts of a forest and is protected by a castle.

Communication.—There is a telegraph station at La Marina di Caronia, and the office is open at limited hours.

Supplies.—Small supplies of fresh provisions may be obtained.

Scogli Bidozza and Chiappa, distant 3 and $1\frac{1}{4}$ miles, respectively, eastward of Caronia, consist of several rocks above water, but all are close inshore.

The 10-fathom curve between Capo Orlando and Caronia extends about $\frac{3}{4}$ mile from the beach, and the 50-fathom curve which lies $\frac{1}{2}$ mile from Capo Orlando gradually extends to 5 miles off Caronia; on the edge of the 50 fathoms, $5\frac{1}{2}$ miles northeastward of Caronia, is Secca di Caronia, a bank with a least depth of 38 fathoms over it.

San Stefano di Camastra, situated $4\frac{1}{2}$ miles westward of Caronia, has a remarkable municipal palace, situated on a green eminence of vines and olives, to the eastward of the houses which form the marina.

Communication.—There is a station on the railroad between Messina and Palermo, and telegraphic communication. The telegraph office is open until 9 p. m.

Supplies of fresh provisions are very limited, but good water may be obtained from a fountain near the railroad station.

Tusa.—Punta Tusa, $4\frac{1}{2}$ miles westward of San Stefano di Camastra is of rugged rocks jutting from the shore; it is foul for 100 yards distant. The Fiumara di Tusa, 1 mile eastward of the point, is crossed by a bridge of masonry, and the Fiumara di Pollina, $3\frac{1}{2}$ miles westward, by a similarly constructed bridge with five arches. Near La Marina di Tusa is a tower, and 2 miles within is the town of Tusa.

Capo Finale, 5 miles westward of Punta Tusa, is a prominent headland, upon which is a tower; around its base are a few rocks, but the water is deep a short distance out, with from 20 to 30 fathoms 1 mile off. The village of Finale standing on the shore, $\frac{3}{4}$ mile eastward, and Castello de Pollina upon a commanding eminence, 2,080 feet above the sea, $2\frac{1}{4}$ miles to the southward of the cape, has a conspicuous tower northeastward of the houses, and forms a good mark.

Coast.—Between Capo Finale and Capo Cefalu, a distance of $5\frac{1}{2}$ miles, deep valleys break through the highland of the interior, down which flow many torrents, the chief of which are those of Malpertuso and Carbone, about .1 mile upon each side of a central projection, named Punta Sant' Ambrogio. Sailing vessels near this part of the

coast, with offshore winds, should be prepared for squalls through the valleys. The Malo Pertuso, or Bad Hole, one of these gorges, from which the gusts rush with much force, is the outlet of the Carbone before named, 2 miles southeastward of Capo Cefalu.

Capo Cefalu is low, and projects from a high conical mount, upon which are the ruins of an old castle; to the eastward, about $\frac{1}{2}$ mile, is a sharp, steep projection, Capo Caldura, surmounted by Torre Caldura, and in the small bay between, some shelter is afforded to coasters.

The fortified seaport of Cefalu (the ancient Cephalaëdium) lies upon the western extremity of the head: it is surrounded by walls of immense blocks of stone and contains a cathedral and several churches. The rocky heights of Monte Sant' Angelo rise to an elevation of 3,480 feet above the sea, at about $3\frac{1}{2}$ miles south of the town.

A small mole is built on the rocky point at the northwestern extremity of Capo Cefalu and affords partial shelter to boats. Nearly 400 yards northwestward of the molehead is a rock with 8 feet water over it.

Light.—From a white octagonal tower, surmounting a white house 86 feet high, erected on the northeastern extremity of Capo Cefalu, is exhibited a flashing white light elevated 262 feet above the sea, and visible 22 miles.

Anchorage.—Vessels wishing to communicate with Cefalu should anchor midway between the town and Punta Santa Lucia, in a depth of 8 fathoms.

Communication.—The line of steamers between Palermo and Brindisi call weekly; there is a station on the railroad between Messina and Palermo, and telegraphic communication. The telegraph office is open till 9 p. m.

Supplies of fresh provisions may be obtained, but only a limited quantity of water; an abundant supply of good water may, however, be procured near Caldura.

Coast.—Punta Plaia, about $3\frac{1}{2}$ miles westward of Cefalu, is clifty; the coast between is bold, indented by several rocky bays, and the dangers do not extend far off, there being depths of from 20 to 30 fathoms at about 1 mile from the shore. Upon the nearest western point from Cefalu is the town of Santa Lucia.

The Fiumara Grande, one of the largest streams in Sicily, is nearly 7 miles westward of Punta Plaia, and midway is Torre Rocella, which is square and in a good state of preservation. The seaport of Termini Imerese is $5\frac{1}{2}$ miles farther on in the same direction. Except to within about 2 miles of the latter, the coast is level and bordered by a sandy beach clear of danger, a few rocks projecting from the

shore eastward of Termini Imerese. Monte Calocero (Calogero), a conspicuous mountain 4,350 feet above the sea lies about $2\frac{3}{4}$ miles southeastward of Termini Imerese.

Termini Imerese.—The town of Termini Imerese (ancient Himeræ), picturesquely situated on the declivity of a hill rising from the sea, is surrounded by an old wall and defended by a castle on a high rock. The streets are in general narrow and dirty, but there are some tolerably good buildings, among which are several churches and convents, a royal college, hospitals, and warm mineral springs, whence it derives its ancient name, etc. The population is about 20,600.

Breakwater.—A breakwater extends in an easterly direction from the point northward of the town. The breakwater extends over Secca di San Giovanni to within about 75 yards of its designed length (1,365 yards.) The space southward of the breakwater has depths of from 2 to $4\frac{1}{2}$ fathoms.

Depths.—From recent surveys it is found that the shore adjoining the city has extended considerably, and the depths in the port have decreased.

Light.—Near the head of the breakwater an iron support 19 feet in height surmounting a white shed exhibits, at an elevation of 28 feet above the sea, a fixed white light.

Lightbuoy.—A buoy exhibiting a flashing green light is moored at a distance of 720 yards 112° from the breakwater lighthouse. Vessels should always pass to the eastward of the lightbuoy to avoid the breakwater extension works. (See Chart.)

Caution.—The lightbuoy is liable to be washed away, and, in its absence mariners are cautioned to approach at night with great care, keeping at a distance of at least 700 yards from the breakwater light.

Mooring buoys.—There are four mooring buoys in the harbor; they lie in an eastward and westward direction, about 267 yards southward of the breakwater, and a small cask buoy for small craft inside of them.

Communication.—There is a weekly steamer to Marseille and Venice; railroad communication with Palermo and Messina, and telegraphic communication with all parts. The telegraph office is open till midnight.

Supplies.—Fresh provisions of good quality are plentiful, and excellent water may be obtained from a fountain near the harbor master's office at the commencement of the breakwater.

Trade.—The principal exports are cereals, sulphur, olive oil, sumach, wine, and salt fish.

Coast.—The Fiume Milicia flows into the sea 8 miles to the north-westward of Termini Imerese, thence a rocky coast, broken into

several small bays, trends $2\frac{1}{2}$ miles to the northward, to the bold head of Capo Zaffarano. Scattered along the coast are some towers, mills, and villages, and the town of Trabia, Altavilla Militia, Casteldaccia, and Bagheria, interspersed by many small streams and watercourses; a range of rocky heights slopes down from Monte S. Onofrio (elevated about 2,600 feet above the sea and $2\frac{1}{2}$ miles from the shore), for 4 miles toward the outlet of the Fiume San Michele; the country is generally fertile. A conspicuous mark for this part of the coast is Pizzo di Cane, a peak 4,020 feet high and about $4\frac{1}{2}$ miles inland.

Trabia (in approximately lat. $38^{\circ} 0' N.$, long. $13^{\circ} 40' E.$), situated on the coast at the foot of a lofty cliff, contains a baronial castle and a fish-curing establishment; Capo Grosso is surmounted by a remarkable castle.

Communication.—There is a railroad station at Bagheria and Santa Flavia on the line between Messina and Palermo, telegraphic communication there, and also at Casteldaccia at limited hours.

Supplies of fresh provisions may be obtained at Casteldaccia.

Tunny fisheries.—Tunny nets are laid out during the season, March to November, from the following places on the coast between Termini Imerese and Cape Zaffarano.

At Trabia, $2\frac{1}{2}$ miles westward of Termini Imerese, extending 2 miles in a north-northeastern direction.

At San Nicola, $4\frac{1}{2}$ miles westward of Termini Imerese, extending 1 mile in a north-northeastern direction.

From in front of the castle at Solanto, near Capo Grosso, for a distance of 1,800 yards in an east-northeastern direction.

At Capo Sant' Elia, $1\frac{1}{2}$ miles to the northward of Capo Grosso for a distance of 1,800 yards in an east-southeastern direction.

The outer ends of these nets are all marked by day with a floating beacon surmounted by a mast, and at night by lights; Trabia and San Nicola nets have a white light, and Solanto and Sant' Elia have three colored lights. (See Caution, p. 61.)

Capo Zaffarano.—A bold but rocky coast, forming two small bays, trends northward $1\frac{1}{2}$ miles, and terminates in Capo Zaffarano; cliffy heights rise to an elevation of above 1,000 feet a short distance within. The cape is a high, isolated, rocky pyramid with a tower, and being separated by low land from the rugged mass of Monte Montalfano, 1,227 feet above the sea, appears at a distance like an island. A little off the head is an islet 20 feet high, and several rocks, with 3 fathoms between, and at $\frac{1}{2}$ mile from the shore there are depths of from 35 to 45 fathoms.

Light.—A white octagonal tower, 36 feet in height, with a dwelling adjoining, and situated on Capo Zaffarano, exhibits, at an ele-

vation of 111 feet above the sea, a group flashing white light, visible 16 miles. (For arc of visibility see Light List.)

A subsidiary light is shown from Capo Zaffarano Lighthouse, which shows in a sector over the Scoglio di Formica. The light is exhibited 93 feet above high water and visible 4 miles. (For sector see Light List.)

Scoglio di Formica, situated 143° , distant $1\frac{1}{2}$ miles from Capo Zaffarano Lighthouse, are two ledges, one awash and one 1 foot above water, but which is sometimes covered, about $\frac{1}{4}$ mile in length in an easterly and westerly direction, and steep-to; there are from 7 to 12 fathoms water around; 45 fathoms about $\frac{1}{2}$ mile northward and eastward of them, and from 7 to 27 fathoms between them and the coast. Secca di Chianca, with 7 fathoms water over it, is about $\frac{3}{4}$ mile northward of Scoglio di Formica.

Beacon.—A beacon, consisting of an iron staff painted in red and black bands, surmounted by a red ball, stands on Scoglio di Formica.

NOTE.—Carried away in 1914.

Anchorage.—Southward of Capo Grosso is Porto d'Espagna (di Spagna), where vessels unable to reach Palermo, during westerly gales, will find good anchorage in 12 and 15 fathoms water, about 1 mile from the beach.

Capo Mongerbino.—From Capo Zaffarano a bold coast, bordered by steep cliffs, trends in a northwestern direction for about $1\frac{1}{2}$ miles to Capo Mongerbino, which is a projection from Monte di Aspra, 1,171 feet above the sea, and about $\frac{1}{2}$ mile to the southward; the cape is surmounted by a tower, and a rock, 10 feet high, lies 100 yards off it.

Bay of Palermo.—Between Capo Mongerbino and Capo Gallo, which latter bears about 11 miles 312° from the former, the coast recedes about 4 miles, and forms the Bay of Palermo, having a bold shore, and a depth of 30 fathoms at about 1 mile distant. Between the hills, whose summits are from 1,970 to 2,549 feet above the sea, and the steep falls of which are from 1 mile to $1\frac{1}{2}$ miles from the shore, are villages, scattered farms, and well-cultivated land. The Fiume Oreto, on the southern side of Palermo, is crossed by a bridge with two arches near the mouth.

About 2 miles northward of Palermo is Monte Pellegrino, rugged, and elevated 1,988 feet above the sea, and remarkable from its isolated position; upon it are a disused signal tower and the large statue of Santa Rosalia. Between the craggy mass which forms Capo Gallo and this mountain is the valley of Conca d'Oro, which terminates in a sandy beach $\frac{3}{4}$ mile in extent, named Baja di Mondello.

Porto di Palermo.—To the northward of the city, and $6\frac{1}{2}$ miles westward of Capo Mongerbino, is the arsenal, from which the north-

ern mole extends in a southerly direction a distance of 700 yards, and in a southeasterly direction 160 yards, into 10 fathoms of water, protecting from the eastward an area sufficiently large for commercial purposes.

The southern mole extends from the southeastern side of Porto Felice, in a northeasterly direction, a distance of 160 yards, and thence in a northerly direction a distance of 450 yards, leaving an entrance between it and the northern mole about 400 yards in width.

The space thus inclosed is much obstructed by shoal flats, over which the depths are from 1 fathom to 3 fathoms, which extend from 200 yards to 500 yards from the shore. Vessels moor with an anchor to the westward and the stern secured to the mole. The customhouse and a health office are situated at the northeastern corner of the port.

A mole extends eastward from Santa Lucia, on the western side of the northern part of the port, for a distance of 400 yards, and at 70 yards northward of Santa Lucia another mole, parallel with it, forming the railroad jetty, extends the same distance.

Porto Felice, a cove $\frac{1}{4}$ mile deep and 200 yards wide, is situated on the southeastern side of the citadel, at the southeastern angle of the city. On its southeastern side is a health office and landing place, and on the northwestward a watering place.

Depths.—There is a depth of 8 to 10 fathoms in the entrance to the port, from $3\frac{1}{4}$ to 8 fathoms in the northern part of the port, from $3\frac{1}{2}$ to $6\frac{1}{2}$ fathoms in the southern part, and $3\frac{1}{2}$ to 4 fathoms in Porto Felice. A 30-foot channel has been dredged to the dry dock.

Vessels can go alongside in the north basin, where the depth is 23 feet; also alongside the north pier, in depths of from 23 to 30 feet.

The railroad company's goods jetty has a depth of 23 feet, and the quays at the northern portion of the basin have a similar depth alongside.

Breakwater.—A new breakwater is under construction, isolated from, and opposite to, the entrance to Palermo Harbor. The progress of the work is marked by spar buoys painted in red and white horizontal bands, moved as necessary. Several cylindrical mooring buoys painted red are also moored along the site of the new work for the use of the vessels employed in the construction.

Lightboat.—A lightboat, exhibiting a fixed green light, is anchored near the southern extremity of the isolated breakwater under construction.

Directions.—Vessels entering Port di Palermo must pass between the lightboat and the head of the South Mole.

Lights.—At 360 yards from the extremity of the North Mole a white circular tower, 65 feet in height, and surmounting a fort, ex-

hibits, at an elevation of 95 feet above the sea, a fixed and flashing white light visible 16 miles. (For arc of visibility, see Light List.)

Near the extremity of the North Mole an iron staff, surmounting a white pillar and shed, the whole 23 feet in height, exhibits, at an elevation of 31 feet above the sea, an occulting green light visible 10 miles.

An occulting red light is shown at an elevation of 30 feet above the sea from a masonry structure 21 feet in height and situated near the extremity of the South Mole, visible 10 miles.

From the outer extremity of Santa Lucia Mole are exhibited two fixed lights, vertical, 6 feet apart, the upper red, and the lower green.

Buoys.—The bank off Forte di Castellamare on the southwestern side of the harbor is marked on its eastern and southeastern side by four black spar buoys.

Two red spar buoys mark the edge of the bank southward of Santa Lucia Pier.

A mooring buoy is moored about midway between the railroad and S. Lucia Piers and 220 yards inside the heads of the piers.

Two mooring buoys are moored northward of the railroad pier.

Harbor regulations.—For half an hour before the time of arrival or departure of the mail steamer to Naples, and until she has completed maneuvering, vessels are prohibited from entering the port or moving in any way from their moorings.

During the time of prohibition the commercial code signal M L will be hoisted at the port office on North Mole.

Beacon.—The outer edge of the shoal southward of Santa Lucia Mole is marked by a red wooden beacon, situated 450 yards 255° from the lighthouse on the extremity of the North Mole.

Pilots.—Pilots may be obtained; their boats are distinguished by the letter P on their sails.

Anchorage.—A good anchorage outside the port is with the lighthouse on the South Molehead bearing about 270° distant 300 yards in 16½ fathoms water over a bottom of stiff mud, or farther out with the North Mole Lighthouse bearing 315°, about ¼ mile distant, in 19 or 20 fathoms over a similar bottom.

Sailing vessels approaching the anchorage should be prepared for squalls in passing Baja di Mondello with fresh westerly winds.

Though a heavy sea sets in with winds from seaward in winter, the anchorage does not appear to be dangerous, provided precautionary measures are adopted.

Vessels anchoring inside the port should be careful to have the anchors buoyed, as several cases of injury to vessels' bottoms have occurred through the projecting flukes of anchors.

With offshore winds anchorage may also be found in the eastern part of the Bay of Palermo in 9 or 10 fathoms water, between Torre Corsaro and Aspra Village.

City.—Palermo (ancient Panormus), the largest city in Sicily, and the capital of a Province, stands in a plain which, from its luxuriance, and from being surrounded by mountains on three sides, has been termed the “conca d’oro,” or the golden shell. It was originally founded by the Phœnicians, passed into the possession of the Carthaginians, and from them to the Romans 254 years B. C. It was afterwards taken by the Saracens, and again by the Normans in 1072.

In front of the city, the numerous steeples, cupolas, and towers of which give it a noble appearance from the sea, is La Marina, extending nearly 1 mile along the bay. At the southern end of the walk, La Flora, a public garden with walks, is interspersed with statues, fountains, and summer houses. Palermo is regularly built; two fine streets, each upward of 1 mile in length, intersect each other at right angles, dividing the city into four equal parts, each leading to one of the four principal gates.

These streets are well paved with large flat blocks of lava, and are faced throughout their whole length with handsome buildings; there are numerous squares, public edifices, convents, and churches. The cathedral, erected about the year 1180, is externally of Gothic architecture. The Royal Palace is a spacious building of mixed Arabic and Norman architecture; on its summit is the observatory erected in 1748.

The Tribunal of Justice and the customhouse occupy a large edifice on La Marina, formerly the Palace of the Inquisition, abolished in 1782. The prison, the Jesuits’ college (a magnificent building), the university, the archbishop’s palace, with several ill-constructed theaters, are among the remaining remarkable buildings. The city is surrounded by an old wall, and defended by a citadel and several other forts, and it is lighted by electricity. The population in the year 1911 was 341,656.

Communication.—Steamers daily to Naples; twice every week to Ustica; weekly to Marseille, Malta, Fiume, Trieste. Trapani, Tunis, Messina, Venice, Brindisi, Cagliari, Port Empodocle, and to Catania and Syracuse; fortnightly to England, Salonica, Constantinople, Genoa, Smyrna, and Odessa; monthly with New York; there are also periodical steamers to Bristol, Amsterdam, Hamburg, and New Orleans.

Railroad communication with Messina, Catania, and Trapani; telegraphic communication with all lines, and electric tramways in the streets, and telephone throughout the city. On payment of a small sum the telephone company will put a telephone on board any vessel in the port. The central telegraph office is always open.

Radio station.—There is a radio station at Sferracavallo, westward of Capo Gallo, open to the public from sunrise to sunset; call letters M P P.

Coal and supplies.—About 18,000 tons of coal are kept in stock amongst a number of firms; from 600 to 800 tons could be put on board in 24 hours, but none on Sundays. There are over 300 lighters, 39 of which are of about 30 tons.

No winds prevent coaling in the port, but strong northeast, south, and southeast winds prevent coaling outside.

Supplies of fresh meat, bread, and vegetables are plentiful and very good, but a few days' notice of requirement should be given; water is supplied from a contractor's water tank in the city; it is brought from Scillato in the Madorne Mountains, a distance of 44 miles; this water, from analysis in London, is reported as irreproachable in quality.

Dock and patent slip.—There is a dry dock in the northeastern corner of the port and a patent slip in Porto Felice. (For particulars, see Appendix I.)

Repairs.—Large repairs to machinery can be executed; there is a 20-ton crane on North Mole, a 3-ton crane on Santa Lucia Mole, a 40-ton steam crane near the docks, two 2-ton and two 5-ton cranes on the railroad pier, and several smaller ones; there is an 8-ton steam hammer. Two divers may be obtained.

Chronometers can be rated at the observatory.

Hospital.—There is a hospital, which receives strangers at a fixed charge.

Trade.—The principal exports are wines, oranges and lemons, sumach, sulphur, grain, olive oil, almonds, and nuts; and imports, petroleum, wine and spirits, tobacco, herbs, timber, coal, and grain.

Consul.—The United States is represented by a consul and vice consul.

Tugs.—Four tugs are available in fine weather.

Capo Gallo, the northwestern extremity of the Bay of Palermo, is the northeastern termination of the mountain of the same name, which rises immediately over it to an elevation of 1,886 feet above the sea, distinguished by dark red patches, and at a distance appearing like an island.

About 1 mile southeastward of Capo Gallo is Punta Mondello, low, projecting and surmounted by a tower; upon the southern side of it is a battery, and others are erected on points 1 and 2 miles farther in; thence the coast trends to the southward, about $3\frac{1}{2}$ miles, to Porto di Palermo.

Light.—On Capo Gallo, a white circular tower, 25 feet in height, and with a white detached dwelling, exhibits a group flashing white

light at an elevation of 133 feet above the sea, which is visible 12 miles. (For arc of visibility see Light List.)

Signal station—Semaphore.—Vessels can communicate with a semaphore, situated about 700 yards southwestward of the lighthouse at an elevation of 1,886 feet above the sea.

Secca la Barra, a bank about 1 mile long east and west, and having a least depth of 43 fathoms over it, lies $4\frac{1}{2}$ miles northeastward of Capo Gallo, and is just inside the 100 fathoms extending from the coast.

Anchorage.—In Baja di Mondello, off the sandy beach, there is anchorage with westerly winds in from 10 to 12 fathoms water, but heavy squalls at times blow down the valleys.

Rock.—A pinnacle rock, with a depth of 6 feet over it, lies with Torre Mondello, bearing 359° , distant 750 yards.

Submarine telegraph cable.—Palermo is connected with Naples via the island of Ustica by a telegraph cable. The cable house (with the inscription "Cavo sottomarino") is situated in Baja di Mondello, about 54 yards from the sea. Two white frame balls indicate the direction (48°) of the first portion of the cable.

On the seaward side of the cable house a notice prohibiting anchorage is affixed.

Coast.—From Capo Gallo an indented rocky coast trends in a westerly direction for $3\frac{1}{4}$ miles to a low projection, and at 2 miles is a small bay named Sferracavallo, which has a small extent of sandy beach and is frequented as a bathing place.

Radio station.—There is a radio station in Sferracavallo Bay, open to the public from sunrise to sunset. The call letters are M P P.

Communication.—Sferracavallo has telephonic communication with Palermo.

Supplies.—Small supplies of fresh provisions and water may be obtained.

Isola delle Femmine, about $\frac{1}{4}$ mile off the low eastern point of the bay, is low and rocky, with a square tower on its summit. The islet is steep to on the northern side, but between it and the shore there is only a boat passage.

Baja di Carini, between Isola delle Femmine and Torre Orsa, is an indentation of the coast $1\frac{1}{2}$ miles deep, along the eastern portion of which is a sandy beach; the remainder is a rocky, broken shore, and on several of the points to the westward are signal stations. The bay is surrounded by high land at about 3 miles from the beach, Monte Castellaccio, over the village of Capaci on the east, attaining an elevation of 3,145 feet, and Montaniello (over Carini upon the west), 3,160 feet above the sea.

The small town of Capaci is at the foot of the steep slopes, $\frac{3}{4}$ mile from the shore, and the town of Carini (ancient Hycara), $2\frac{1}{2}$ miles inland from the western side of the bay; it has a gothic castle, several churches, convents, etc., and a population of about 12,000. Beyond the mouth of Fiume della Grazia, where the rocky coast takes a northerly trend for about 1 mile, is Torre Muzza.

Communication.—There is a telegraph station at Capaci, and a railroad station at Carini on the line between Palermo and Trapani.

Anchorage may be taken up in the bay with the town of Capaci bearing 133° in from 8 to 19 fathoms water, or southeastward of Torre Muzza in $4\frac{1}{2}$ fathoms about 400 yards from the shore.

Tunny fishery.—Tunny nets are laid out during the season, March to November, about 1 mile eastward of Punta Raisi; they extend for 2 miles in a northerly direction from Torre Orsa. The outer end of the nets is marked by day with a floating beacon, surmounted by a mast, and at night with a white light. (See Caution, p. 61.)

Golfo di Castellamare.—Punta Raisi is the northern extremity of a low rocky and foul shore fronting the high land before mentioned, together with that of Monte Palmito to the southwestward, 1,700 feet above the sea. Between Punta Raisi and Capo San Vito the coast forms Golfo di Castellamare, an indentation about 10 miles deep, named after the town at the head.

Depths offshore.—Except off the rocky points at both extremities the bay is generally clear of danger, deepening gradually to 100 fathoms at 4 miles distant, which depth will be found at less than 1 mile along the western shore; the eastern, however, is less precipitous; the bottom is generally of mud; in the center of the bay the depths are about 350 fathoms, over mud.

Coast.—On the eastern side of the bay from Capo Rama, which is bold, clear of danger, and surmounted by a tower, the coast is composed of cliffs from 80 to 100 feet above the level of the sea, and trends in a southerly direction for a distance of $3\frac{1}{4}$ miles to the mouth of Fiume Poddastci; the rocks are perforated with some caverns or grottoes, and on the slope of the mountains are a few houses and castellated buildings; on the banks of the river are several mills. The large town of Partinico lies at the foot of Monte Cesaro, 1,485 feet above the sea, and about 4 miles from the coast. The town has an export trade in wine and oil, and manufactures of woollen and silk fabrics.

Communication.—There is a railroad station on the line between Palermo and Trapani at Partinico, also telegraphic communication.

Coast.—From Fiume Poddastci a sandy beach stretches for $9\frac{1}{2}$ miles in a west-southwestern direction to Castellamare, and at $2\frac{1}{2}$ and

4 miles, respectively, are the villages of Trappeto and Balestrate; the railroad skirts the beach from Trappeto to Castellamare.

Castellamare del Golfo, a seaport situated in the southwestern corner of the bay, affords but little accommodation except for small coasters and fishing boats; it stands in a cove rather more than a cable wide, at the head of which small vessels haul up on a beach. The town is small and dirty, and on a rocky tongue of land which forms the eastern side of the cove is a dilapidated castle. The exports are wine, cotton, fruit, manna, and sumac, and the population about 15,300.

Steep, cliffy ridges rise immediately over the town and extend some distance southward; Monte Inice, elevated 3,546 feet above the sea, lies 2 miles to the southward, and about 6 miles from the town, in the same direction, is the ruin of a beautiful temple and other vestiges of Segesta (ancient Segestoe), near which is the town of Calatafimi.

Light.—An occulting white light is exhibited, at an elevation of 50 feet above the sea, from a small masonry tower, 46 feet in height, on the western side of the entrance to the port; it is visible 9 miles.

Shoal.—A shoal, with 11 feet water over it, lies 867 yards 343° from the castle.

Mooring buoy.—A red mooring buoy, with “Boa di Castellamare” upon it, is moored in the roadstead off Castellamare in a depth of 39 feet. (Carried away in 1914.)

Communication.—Railroad communication with Palermo and Trapani, the railroad station being at San Bartolomeo, about 2½ miles to the eastward.

Supplies of fresh provisions and water are scarce.

Tunny fisheries.—Tunny nets are laid out during the season, March to November, near Castellamare at the following places:

About 2½ miles eastward of the town for a distance of about 1½ miles in a northerly direction.

Southward of Porto Point in a north-northeastern direction for a distance of 1 mile.

The outer ends of the nets are marked by day with a floating beacon surmounted by a mast, and at night with a white light. (See Caution, p. 61.)

Coast.—A rocky coast, bordered by steep cliffs, trends in a northerly direction for 1½ miles from Castellamare to two salient points, the southern named Porto Point (Punta la Porto); on the western side of the other is a bay, open to the northeastward. The general direction of the coast (which is broken and rocky) is about north-westward for 2½ miles to Torre Scopello. About 2½ miles westward of the tower is Monte Sparagio (3,637 feet), the range, of which it

is the southern termination, extending across to Monte Cofano on the western coast of Sicily, and also to the northward toward Capo San Vito.

Shoal.—To the southward of Torre Scopello are several rocks; a shoal, with $3\frac{1}{2}$ fathoms water on its extreme edge, extends about 600 yards from the point under Torre Scopello; there are 20 fathoms just outside it, and with northeast winds the sea breaks heavily on this shoal.

Punta Solanto, named also Monaca, 7 miles to the north-north-westward of Torre Scopello, has a fringing shoal which extends seaward 300 yards. All along this part of the coast the water is deep, 100 fathoms being obtained in some places, within $\frac{1}{4}$ mile of the rocks.

Tunny fisheries.—Tunny nets are laid out during the season, March to November, at the following places on the coast between Porto Point and Punta Solanto:

From near Torre Scopello, for a distance of about 1,650 yards in a northeasterly direction.

At about 1 mile southward of Punta Solanto in an east-southeasterly direction for a distance of about 600 yards.

The outer ends of the nets are marked by day with a floating beacon surmounted by a mast, and at night with a white light. (See Caution, p. 61.)

Baia di San Vito.—Capo San Vito lies about $1\frac{1}{2}$ miles westward of Punta Solanto, and has a lighthouse on its extremity. The point on which the lighthouse stands forms the western side of a small bay, at the head of which is the little village of San Vito.

Anchorage.—There is good anchorage in the bay with westerly winds, in 6 or 7 fathoms water, over mud, with the lighthouse bearing 330° , and Torre del Roccazzo, a town on the shoulder of the first rise of land inside Capo San Vito, in range with a small tower near the beach, northward of the village, about 240° . The south shore of the bay is shallow.

Tunny fishery.—Tunny nets are laid out during the season, March to November, in Baia di San Vito; the nets extend in a northeasterly direction for $1\frac{1}{2}$ miles from the head of the bay. The outer end is marked by a floating beacon surmounted by a mast by day and a white light at night. (See Caution, p. 61.)

Communication.—There is a good carriage road to Trapani, and telegraphic communication at limited hours.

Supplies.—Fresh beef in a limited quantity may be obtained, but sheep and goats are plentiful; water is not good.

The description of this coast from Capo San Vito westward is given at page 505.

APPENDIX I.

PARTICULARS OF DRY DOCKS, PATENT SLIPS, ETC.

Port.	Name of dock.	Length.		Breadth of entrance.	Depth at H. W. O. S.		Lifting power.	Date built.	Remarks.
		On blocks.	Over all.		On sill.	On blocks.			
Marseille.	No. 1.....	Fect. 567	Fect. 585½	Fect. 53½	Fect. 25	Fect. 23	Tons.		These docks are entered from the repairing basin, the entrance to which from the National Basin is 92 feet in width and 26½ feet in depth at present but is being dredged to a depth of 31 feet.
	No. 2.....	361	344½	72½	21½	18½			
	No. 3.....	295	295	54½	21½	18½			
	No. 4.....	279	295	54½	21½	18½			
	No. 5.....	410	428½	54½	21½	21½			
	No. 6.....	410	428½	54½	21½	21½			
	No. 7.....	669	669	82	20½	21½			
La Ciotat.	Messageries Maritimes	457	529	87	20	18½			No particulars known.
	Patent slip.....								
	Arsenal principal No. 1.....	199	247	159½	21½				
	Arsenal principal No. 2.....	189	245	159½	21½				
	Arsenal principal No. 3.....	207½	292½	171	25½				
	De Castigneau No. 1.....	250½	325	171½	27½				
	De Castigneau No. 2.....	312	385½	173½	27½				
Toulon.	De Castigneau No. 3.....	512	535	177½	30½				Can be divided by an intermediate caisson. No. 1 Messiey dock is completed; new dimensions not given.
	Messiey No. 1.....	375	427	191½	32½				
	Messiey No. 2.....	375	427	191½	32½				
	Messiey No. 3.....	557	585	88	34			1898	
	New basin, 4 docks, building, each.		666		36				
Villefranche.	Bacino di Darsena.....	212	294	28	9				Approaches to be dredged to 42 feet.
	No. 1.....	259	584	70	194				
	No. 2.....		721½	81	31	32½		1892	
	Floating, No. 2.....		285	50	21	17	2,900	1899	
	Government, No. 1.....		256½	63½	21½				
	Government, No. 2.....		361	75	27½				
	Government, No. 3.....		433	82	26				
Spezia.	Government, No. 4.....		433	82	26				Can be subdivided. Breadth can be increased 3 feet. Constructing.
	Bacino Umberto I, No. 5.....		361	75	29½				
	Bacino Umberto I, No. 6.....		705	106	33				
			503	90	33	32½		1890	
								1899	

¹ At coping.

Port.	Name of dock.	Length.		Breadth of entrance.		Depth at H.W.O.S.		Lifting power.	Date built.	Remarks.
		On blocks.	Over all.	Fet.	Fet.	On sill.	On blocks.			
Leghorn.	Bacino di Carenggio.	Fet. 436	Fet. 446	Fet. 69	Fet. 23	Fet. 23	Fet. 20½	Tons. 1,500		Can take a vessel of 500 tons; moored in Catena Inlet.
Bonifacio.	Patent slips, Nos. 1 and 2.	1,280	1,27	127	Forward alt.	21	24			
Ajaccio.	Floating dock.									
Naples.	Patent slip.	118		116						Lengths can be increased by 33 feet with caisson in outer stops; can be increased by 23 feet, and over all by 33 feet with caisson in outer stops. There is a patent slip at French Creek and at the Marsa.
	(Government.)	643	239	83	22	22	36			
	Bacino, No. 1.	331	656	93	33½	23½	26		1907	
	Bacino, No. 2.		381	58						
Malta.	No. 1, outer.	{ 255½ 272 }	255½	73½	23½	23½	18½			
	No. 1, inner.	{ 270½ 535½ }	300½	68½	23½	22½	20			
	No. 1, as one.	{ 535½ 582½ }	566½	73½ to 68½	22½	22½	18½			
	No. 2, Hamilton.	{ 520 538½ }	538½	92½	32½	32½	29½			
	No. 3, Somerset.	{ 558 576½ }	576½	79½	32½	32½	28½			
	No. 4, outer.	{ 427½ 440 }	471½	93½	34½	34½	34½			
	No. 4, inner.	{ 480 330 }	480	93½	36½	36½	33½			
	No. 4, as one.	{ 790 830 }	790	93½	34½	34½	34½			
	No. 5.	{ 550 590 }	550	93½	34½	34½	34½			
	Hydraulic.	345½	359	62½			16½ and 18½	1,000	1871	
Taranto.	Principe di Napoli.		722	100	33					Can be subdivided into two; the outer 394 feet long, and the inner 328 feet long. Building. Lengths can be increased by 36 feet, with caisson in outer stops.
	Dry dock.	771	784	118	39½	39½				
	(Government, floating.)	365	365	61	25	25		4,800		

* 211½ on pontoons.

* Caisson in outer stop.

* Cradle.

APPENDIX II.

LIST OF PRINCIPAL PORTS, SHOWING PARTICULARS OF DEPTHS, ETC.

Port.	Depth at L. W. O. S. in channel of approach.	Depth at L. W. O. S. in anchorage.	Rise of tide.	Remarks.
Ajaccio.....	Deep water.....	5 to 15 fathoms.....	.....
Aranci.....	Deep.....	8 to 13 fathoms.....	Nil.....	
Augusta (Porto di).....	10 to 20 fathoms.....	8 to 11 fathoms.....	4 to 15 inches.....	Rise of tide is much affected by wind.
Cagliari.....	Harbor entrance, 25 feet.	Roads, 6½ to 10 fathoms; harbor, 21 to 27 feet.	Nil.....	
Catania.....	Harbor entrance, 5 to 8 fathoms.	L'Avamperto, 4 to 8 fathoms; Porto Nuovo, 3½ to 8 fathoms; Porto Vecchio, 22 to 27 feet.	3 to 12 inches.....	The tides are influenced by the winds.
Genoa.....	Deep water.....	6 to 10 fathoms.....	.....	Port Vittorio Emanuele. Inner port.
Leghorn.....	4 to 10 fathoms.....	4½ to 5½ fathoms.....	.....	Leghorn Road.
	26½ feet north entrance.	4½ to 9 fathoms.....	.....
	5 fathoms south entrance.	22 to 26 feet.....	.....	Outer port.
Maddalena.....	6 to 8 fathoms.....	5 to 12 fathoms; 8 to 20 fathoms in Rada di San Stefano.	Nil.....	
Malta.....	10 to 12 fathoms.....	Grand Harbor, 5 to 13 fathoms; Marsa Musciet, 12 to 16 fathoms.	Springs, 10 to 14 inches (approximately).	
Marmarice.....	Deep water.....	7 to 20 fathoms.....	.....
Marseille.....	do.....	14 to 18 fathoms.....	.....
Messina.....	Harbor entrance, 30 fathoms.	Harbor, 10 to 36 fathoms.	No regular....	
Naples.....	Deep water.....	7 to 14 fathoms.....	.....	Outer port.
Oran.....	Harbor entrance, 6 fathoms.	L'Avant Port, 3 to 8 fathoms; Vieux Port, 3½ to 3½ fathoms.	Nil.....	Westerly winds raise the level of the water in the port; easterly winds lower it, the difference between the two levels amounts to about 2 feet.
Palermo.....	Harbor entrance, 8 to 10 fathoms.	Harbor, 3½ to 8 fathoms; Porto Felice, 3½ to 4 fathoms.	.....do.....	
Palma.....	Harbor entrance, 24 feet.	Harbor, 13 to 26 feet; Roads, 7 to 8 fathoms.	.....do.....	
Spezia.....	6 to 7 fathoms.....	5½ to 7 fathoms.....	.....
Taranto.....	Deep water.....	7 to 16 fathoms.....	.....	Mar Grande.
Tarragona.....	Harbor entrance 26 to 30 feet.	Outer harbor 12 to 22 feet; inner harbor, 24 to 30 feet.	Nil.....	A depth of 29 feet can be carried into the inner harbor.
Terranova.....	24 to 29 feet, 19 feet in channel, to town and Porto Romano.	22 to 28 feet, 20 feet off town, 20 to 25 feet in Porto Romano.	.....do.....	
Toulon.....	Deep water.....	6 to 13 fathoms.....	.....

APPENDIX III.

CAUTION TO BE OBSERVED WHEN APPROACHING BRITISH PORTS.

PART I—CLOSING OF PORTS.

(1) As circumstances may arise in which it will be necessary on account of periodical exercises, maneuvers, or otherwise to forbid all entrance to certain ports of the British Empire, on approaching a port a sharp lookout should be kept for the signals described in the following paragraph and for the vessels mentioned in paragraph (5), Part II, of this notice, and the distinguishing and other signals made by them. In the event of such signals being displayed, the port or locality should be approached with great caution, as it may be apprehended that obstructions may exist.

(2) If entrance to a port is prohibited, three red vertical lights by night or three red vertical balls by day will be exhibited in some conspicuous position in or near to its approach, which signals will also be shown by the vessels indicated in paragraph (5), Part II, of this notice.

If these signals are displayed, vessels must either proceed to the position marked "Examination anchorage" on the charts and anchor there or keep the sea.

(3) At all the ports or localities at home or abroad searchlights are occasionally exhibited for exercise.

Instructions have been given to avoid directing movable searchlights during practice onto vessels under way, but mariners are warned that great care should be taken to keep a sharp lookout for the signals indicated in paragraph (2) above when searchlights are observed to be working.

PART II—EXAMINATION SERVICE.

(4) In certain circumstances it is also necessary to take special measures to examine vessels desiring to enter the ports or localities at home or abroad.

(5) In such case vessels carrying the distinguishing flags or lights mentioned in paragraph (7) will be charged with the duty of examining vessels which desire to enter the ports and of allotting positions in which they shall anchor. If Government vessels, or vessels belonging to the local port authority, are found patrolling in the offing, merchant vessels are advised to communicate with such vessels with a view to obtaining information as to the course on which they should

approach the examination anchorage. Such communication will not be necessary in cases where the pilot on board has already received this information from the local authorities.

(6) As the institution of the examination service at any port will never be publicly advertised, especial care should be taken in approaching the ports, by day or night, to keep a sharp lookout for any vessel carrying the flags or lights mentioned in paragraph (7) and to be ready to "bring to" at once when hailed by her or warned by the firing of a gun or sound rocket.

In entering by night serious delay and risk will be avoided if four efficient all-round lamps, two red and two white, are kept available for use.

(7) By day the distinguishing flags of the examination steamer will be a special flag (white and red horizontal surrounded by a blue border) and a blue ensign; also three red vertical balls if the port is closed.

By night the steamer will carry "three red" vertical lights if the port is closed and "three white" vertical lights if the port is open.

The above lights will be carried in addition to the ordinary navigational lights and will show an unbroken light around the horizon.

(8) Masters are warned that when approaching a British port where the examination service is in force they must have the distinguishing signal of their vessel ready to hoist immediately the examination steamer makes the signal.

(9) Masters are warned that before attempting to enter any of these ports when the examination service is in force they must, in their own interests, strictly obey all instructions given to them by the examination steamer. In the absence of any instructions from the examination steamer, they must proceed to the position marked "Examination Anchorage" on the charts and anchor there or keep the sea.

While at anchorage in the examination anchorage masters are warned that they must not lower any boats (except to avoid accident), communicate with the shore, work cables, move the vessel, or allow anyone to leave the vessel without permission from the examination steamer.

(10) In case of fog, masters of vessels are enjoined to use the utmost care, and the Examination Anchorage itself should be approached with caution.

(11) Merchant vessels when approaching ports are specially cautioned against making use of private signals of any description, either by day or night. The use of them will render a vessel liable to be fired on.

(12) The pilots attached to the ports will be acquainted with the regulations to be followed.

APPENDIX IV.

MALTA.

HARBOR REGULATIONS.

Foreign naval vessels and transports.—(1) Unarmed sailors and soldiers from foreign naval vessels and transports may, as a general rule, be landed on shore leave without the necessity of previously obtaining the formal permission of the Governor. It is requested, however, that on occasions when it is desired to land large numbers of men, or bodies in military formation, or unarmed pickets to assist the local police, application may be made beforehand, in order that all possible facilities may be given.

(2) Applications for permission to land armed parties in connection with funerals, or to take part in public ceremonies of an exceptional nature, should also be addressed to the Governor through the usual channel.

PORT REGULATIONS.

(1) No vessel arriving at these islands from any place beyond seas shall enter any port in these islands other than the Great Harbor of Valletta or the Quarantine Harbor.

If any such vessel shall enter any such other port, the master shall forfeit a sum of money not greater than \$250 and not less than \$10.

When a naval vessel is entering or leaving Grand Harbor a red flag is hoisted at Castille signal station, customhouse flagstaff, or Palace Tower flagstaff. While this red flag is hoisted vessels are not permitted to leave their berths or enter the harbor.

(2) No master of a merchant vessel shall moor his vessel between the mouth of the Great Harbor and the point of Senglea, or keep the said vessel at anchor there for a time longer than necessary to approach the Marina or some mole, or to depart from thence; or moor the said vessel in the places where the passage boats usually disembark their passengers, or otherwise obstruct the passage of such boats.

(3) No steamer shall be allowed to drop or weigh anchor without a pilot in the area within two lines, the one drawn from Calcara Gate landing place to Isola Point, and the other from the police station outside advanced right Marina gate to Ras Hanzir.

(4) No master of a merchant vessel shall make fast any chain or rope to any of the buoys laid down for the use of the British; or

careen his vessel except in one of the places established for that purpose by the collector of customs; or melt pitch, tar, resin, or other inflammable substance on the moles, or in a boat, or in close proximity to any vessel, or in places not selected for that purpose by the said collector of customs.

(5) The master of mail and other steamers having passengers on board shall, with the least possible delay, cause all available accommodation ladders to be lowered on both sides of the vessel.

(6) No master of a merchant vessel shall fasten his vessel anywhere but to the bollards or rings intended for that purpose; or fasten with chains the vessel to the said bollards without using a mat or such other means as, in the opinion of the said collector of customs, may be sufficient to prevent the chain from damaging the wharf.

All merchant vessels lying at anchor shall have their anchors and chains so as not to come in contact with the anchor and chains of other vessels when in boisterous weather they loosen their hawsers from the land.

Every vessel, anchored or moored in any part of the harbor, shall keep her jib boom and flying jib boom thoroughly rigged in.

Every master or owner of a merchant vessel shall during the night keep a guard on board of the said vessel; and shall keep any boat belonging to the said vessel moored and without oars.

(7) No master shall permit any boat to approach his vessel, except pilot boats and steam tugs seeking hire, before the officer charged with such duty by the said collector of customs shall have visited the vessel; or any person to disembark before the vessel shall have received pratique.

(8) Every master of a merchant vessel shall prevent any smoking or any fire being kept alight on board while in the act of loading or unloading hemp, esparto grass, or other merchandise of an inflammable nature until the hatches shall have been secured.

(9) Every master of a merchant vessel shall declare to the said collector of customs the quantity of gunpowder which he may have on board and shall not approach the mole to unload any merchandise before having deposited such gunpowder in the place pointed out by the said collector of customs; and in case he has more than three barrels of gunpowder, he shall, on entering the port, extinguish all fires, except steaming fires, and shall anchor the vessel in the place which shall be pointed out by the said collector of customs. He shall keep a red flag at the mainmast head until such powder shall have been deposited, and previously to commencing to deposit the same he shall expressly warn the vessels lying near.

(10) It is prohibited to throw into the ports anything which might cause deposits of mud or in any other way alter the bottom of the

port or obstruct the mouths of the public sewers which discharge into the sea; or to leave in the ports or on the moles any merchandise or other rotten or unwholesome thing which might be prejudicial to the public health or give rise to a nuisance.

(11) It is prohibited to the owner, consignee, agent, master, or other person in charge of any vessel arriving in Malta from any place out of these islands to land, or permit to land, without the permission in writing of the collector of customs, any person who has secreted himself and arrived in such vessel.

(12) The use of the steam whistle, foghorn, or siren is confined to vessels under way, for the purpose of safe navigation. Vessels lying at anchor or moored in the harbors are not to use the steam whistle, foghorn, or siren for any purpose whatever.

(13) Every master of a merchant vessel must exactly follow any instructions which the superintendent of the ports may give in regard to the place where his vessel is to lie and in regard to the position of the said vessel.

(14) Commanders or masters of vessels are hereby warned that, owing to the large number of small craft plying in the harbor at all hours, strict attention should be paid to moorings to prevent their being tampered with.

In the event of any suspicious circumstances, such as boats without lights approaching during the night, the police should be at once communicated with, a message being sent to the customhouse, if necessary.

(15) No goods shall be discharged on Sundays or public holidays, or on other days except between the hours of 6 a. m. and 6 p. m. from April 1 to September 30, inclusive; and between 7 a. m. and 5 p. m. from October 1 to March 31, inclusive, unless by special permission of the collector of customs.

Pilots are absolutely precluded from making any private arrangements with masters of vessels or agents, and from receiving any pecuniary or other remuneration in excess of the established tariff. Should it, however, under very extraordinary circumstances, be considered desirable to offer a gratuity to any member of the pilot service, such gratuity may be received by special permission of the collector of customs.

Any complaints against pilots should be made in writing and addressed to the collector of customs.

APPENDIX V.

FRENCH PORTS.

Regulations.—The following regulations respecting navigation in time of war, have been issued by the French Government, and if necessary they may be brought into force during a period of political tension :

1. No vessel, other than French naval vessels, may approach the French coast within a distance of 3 miles without special permission.

2. Between sunrise and sunset vessels are to exhibit their national flags and numbers by international code, directly they come within signalling distance.

If wishing to enter the prohibited zone, they are to hoist the pilot signal and remain outside the 3-mile limit until signalled to enter from a signal station or examination vessel.

3. From sunset to sunrise vessels approaching the coast are to exhibit their national flags and navigational lights.

If wishing to enter the prohibited zone, they are to burn Bengal lights and sound blasts on the siren, remaining outside the 3-mile limit until permission to enter is given from the examination vessel.

4. Any vessel, summoned by the firing of a blank charge, is to stop and check her way ; if this warning be disregarded, after an interval of two minutes a shot will be fired, and at the expiration of a further two minutes fire will be opened upon her.

In case of urgency the warning by blank charge may be omitted, and at night any vessel approaching within the 3-mile limit is liable to immediate destruction.

5. In military ports and roadsteads no boats, other than those belonging to French naval vessels, are allowed to be under weigh between sunset and sunrise.

Between sunrise and sunset boats are allowed to be under weigh if provided with a special permit, and under certain restrictions.

In commercial ports the same regulations will hold good, but so arranged as to interfere as little as possible with commercial interests.

6. All vessels permitted to enter harbor are to take up their allotted anchorages, and may not leave or shift billet without permission.

See Appendix IV, H. O. No. 151, Mediterranean Pilot, volume 1, 1916.

APPENDIX VI.

REGULATIONS CONCERNING THE TEMPORARY CLOSING OF FRENCH PORTS FOR EXERCISES, MANEUVERS, ETC.

Access to French ports may be forbidden or subjected to certain regulations on account of naval maneuvers, exercises, or for any other cause.

Under these circumstances:

1. A warning signal will be made from a conspicuous point, consisting of three balls, one above the other, by day, and three red lights, one above the other, by night.

2. The same signal will be shown from the watch vessel.

3. Any vessel wishing to go into or out of French waters when one of the above signals is made should, by day, hoist the pilot flag, and await the arrival of the watch vessel; by night, burn one or more Bengal lights, accompanied by the whistle or siren, and await the arrival of the watch vessel.

4. At the challenge or a warning shot from the watch vessel every vessel must stop or heave to.

5. Vessels, in this case, will be subject to a visit by the watch vessel, which will give them instructions as follows:

- (a) If a special examination service is established, where it will be found.

- (b) If the entrance to the port is closed, and for how long.

- (c) If any special instructions exist for the navigation of a fixed region.

6. For vessels leaving the port the required instructions will be given in the port by the maritime authorities.

7. Vessels which disobey the above instructions will do so at their own risk and peril, and will be obliged to make good any damage they are the cause of.

APPENDIX VII.

REGULATIONS AND SIGNALS RELATIVE TO FRENCH SUBMARINES.

I. General regulations.—1. When meeting other vessels, and, except in the case hereafter mentioned (when flying diving flag), submarines navigating on the surface must conform to the usual Rule of the road.

When, on the contrary, submarines are navigating submerged, all other vessels should give them a wide berth.

2. The presence of submarines submerged is indicated by a square flag, with one yellow and one red horizontal stripe, hoisted at any signal station, lighthouse, fort, etc., in sight of which the submarines are maneuvering, or by a vessel, torpedo boat, or tug accompanying them.

3. When a vessel is navigating in a neighborhood where submarines are signaled submerged, the master must station special lookouts to watch the surface of the sea and report all floating objects.

The periscopes (optical tubes of submerged submarines) are distinguished from other objects usually met with, in that they appear like a round post standing vertically out of the water.

4. Although submerged submarines may be met in all French waters, masters of vessels should be particularly on the lookout for them in the neighborhood of Toulon and Ajaccio, where submarine flotillas are stationed.

5. In order to give every convenience to vessels making or leaving the ports frequented by submarines, zones have been fixed which are forbidden to submerged submarines. Masters frequenting these ports are strongly advised to navigate in these zones.

II. Regulations and signals relative to submerged submarines.—1. The signal stations hoist the flag (one red and one yellow horizontal stripe) to warn vessels near the coast that submarines are submerged in the neighborhood.

2. Every vessel convoying a submarine carries, as distinctive signal, the aforesaid flag forward and a white ball aft in place of the national ensign.

Every vessel observing these distinctive signals should steer to pass at least $\frac{1}{2}$ mile astern of the convoying vessel.

3. During submerged exercises the submarines carry forward the red and yellow flag and aft the national ensign.

Every vessel observing these signals should give a wide berth to the submarine, which, even should she be momentarily on the surface, is considered as exempt from Rules of the road.

III. Regulations relative to firing torpedoes from submerged submarines.—1. The target vessels or vessels towing a target for submerged submarine torpedo practice carry during the firing exercises, besides the ordinary large red firing flag, a large flag (one red and one yellow horizontal stripe), hoisted in a clearly visible place.

2. Vessels should give the route of the target a wide berth, passing at least $\frac{1}{2}$ mile from it.

3. When the target or towing vessel sees a vessel standing on a course dangerous to the submarine, it may hoist the International code signal M N (Stop immediately) and fire a gun if necessary.

The vessel signaled should immediately obey this signal.

The signal M H of the same code intimates that she may continue her course.

The vessels convoying submarines may also, in case of urgency, make use of these signals.

4. When possible the target vessel is accompanied by a swift dispatch boat, ready to convey to vessels in sight any order, by voice or by aid of a blackboard.

IV. Regulations and signals relating to the protection of submarines at moorings.—1. All vessels and boats are forbidden to go alongside submarines anchored or moored in ports or roadsteads without a special permit.

2. By night the submarines anchored or moored in ports or roadsteads carry, in addition to the ordinary anchor lights, three lights vertical (two red above one white) and distant 6 feet apart.

APPENDIX VIII.

ITALIAN PORTS.

Regulations.—(A) The following regulations for foreign naval vessels anchoring in Italian ports have been issued by the Italian Government:

1. Foreign naval vessels can not remain at fortified ports for a period of more than eight days, and not more than three vessels of the same flag may assemble at these anchorages, unless formal permission, which must be applied for through a diplomatic channel, has been received.

2. The following are the fortified ports in the limits of this volume: Vado (Savona), Genoa, Spezia, Mount Argentario, Talamone, Gaeta, Taranto, and anchorages on both sides of Messina Straits.

The following fortified ports are to be saluted by naval vessels: Genoa, Spezia, Gaeta, Taranto; also Naples and ports where an Italian naval vessel capable of returning the same may be lying.

3. Foreign naval vessels anchored in any of the above-mentioned places must leave at any time if requested, and at the expiration of the period stated in Article I.

4. The naval authorities will probably send an officer to point out the anchorage assigned to the vessel, but in the event of this not being done anchorage may be taken up as convenient.

5. Should pratique be refused, the medical officer of the vessel should be sent to the local sanitary office to ascertain the treatment to which the vessel or vessels are to be subjected, and all port regulations must be carried out.

6. No surveying or hydrographic operations are to be carried on without special permission from the Government, and the following are also forbidden within the territorial waters: (a) The execution of a death sentence. (b) Vessels carrying on hostilities with each other, or bringing prizes or searching vessels. (c) Landing to execute maneuvers on or gun practice within gun range from the coasts, without special permission.

7. With the exception of officers and petty officers the crew of a foreign naval vessel must always land unarmed, and should it be wished to send an armed funeral party, permission must be obtained.

(B) The following regulations are to be observed in time of war:

(1) Every vessel approaching a fortified harbor by day must hoist the flag of her nationality before coming within range of artillery fire, and must remain outside the range of the guns of the fort while signals are exchanged, and until permission to enter the port is granted.

The failure to comply with this regulation will cause first blank cartridge and afterwards shot, if necessary, to be fired at the vessel from the nearest fort.

No vessel may enter a fortified harbor at night.

(2) The movement of boats, belonging to neutral naval vessels, within the area of fortified harbors, is absolutely prohibited, both by day and by night, but vessels anchored in the harbors may communicate with the shore during the day in accordance with rules laid down by the commandants, and in cases of urgency a boat, belonging to the fortress, may be obtained to communicate at night, by signaling the request.

(3) Vessels wishing to anchor in any of the naval or fortified ports of Italy, a list of which and of their signal stations is given below, must not approach such ports within a distance of 5 miles, and must ask for anchorage by means of hoisting, in addition to the name of the vessel, the International Pilot signal, or the International Code signal P D. "Permission is urgently requested to enter harbor."

Port or anchorage.	Locality.	Signal stations with which vessels must communicate.
Spotorno.....	Gulf of Genoa.....	Cape Noli.
Vado.....	do.....	Do.
Savona.....	do.....	Do.
Sestri Ponenti.....	do.....	Cape San Benigno.
Genoa.....	do.....	Do.
Sturla.....	do.....	Do.
Bogliasco.....	do.....	Do.
Sori.....	do.....	Do.
Levanto and Monterosso.....	do.....	Palmaria Island
Portovenere.....	Italy, west coast.....	Do.
Spezia and Lerici.....	do.....	Do.
Bocca di Magra.....	do.....	Do.
Marina di Avenza.....	do.....	Do.
Talamone.....	do.....	Mount Argentario.
Port Santo Stefano.....	do.....	Do.
Port Ercole.....	do.....	Do.
Gaeta.....	do.....	Orlando Tower.
Formia.....	do.....	Do.
Maddalena Road and approaches.....	Sardinia.....	Cape Ferro.
Messina.....	Sicily.....	Fort Spuria.
Milazzo.....	do.....	Do.
Villa San Giovanni.....	Italy, west coast.....	Capo d'Armi.
Reggio.....	do.....	Do.
Taranto.....	Italy, south coast.....	Cape San Vito.
Ancona.....	Italy, Adriatic.....	Mount Coppuccini.
Port Nuovo.....	do.....	Do.
Brindisi.....	do.....	Fort Mare.
Port Corsini.....	do.....	Port Corsini.
Port Chioggia.....	do.....	Sottomarina.
Venice and approaches.....	do.....	Pilot tower San Nicolo d Lido.

APPENDIX IX.

REGULATIONS WITH REGARD TO VESSELS APPROACHING FORTIFIED PORTS IN A STATE OF WAR.

1. The military commander of a fortified port in a state of war may, if the circumstances so require, order all foreign naval vessels, as well as foreign and Italian merchant vessels, anchored within the fortified zone, to proceed to sea or move elsewhere, leaving the waters adjacent to the port free for a distance of 10 miles. Vessels receiving such directions are bound to move within a maximum period of 12 hours from the time the order is delivered on board their vessels. The military commander will provide tugs for such vessels as are not in a state to put to sea within the limits of time specified, and will conduct them to some other place, according to the exigencies of the port. In the event of a refusal to leave the port the military commander may have recourse to such means as the necessities and urgency of the case may require.

2. Any vessel which approaches during the day any fortified port in a state of war, either for the purpose of approaching it or merely because her track leads within the 10-mile limit, is to take steps to insure her recognition, and is not to proceed toward the anchorage within the fortified port without having previously received the permission of the military commander through one of the semaphore stations included in the list given in article 10.

3. In order to obtain permission to enter, vessels must first be completely recognized. In which case they may proceed toward the space comprised within the limits specified in the list given in article 10, but must stop when within sight of the defense works, and keep flying in an elevated position the national flag and the vessel's name in the International Code, to which is to be added the pilot flag and the International Code signal P D, "I request permission to enter." Permission may also be asked by radio, but this does not relieve a vessel of the necessity of stopping on arriving at the limits herein-after described and waiting for a reply.

4. The military commander will decide whether or not permission to enter is to be given to vessels which have complied with the foregoing article, and is to take into consideration that the presence of such vessel within the port is not to be allowed to subsequently interfere with or obstruct its means of defense.

5. The semaphore station which shall have received, by means of radio or other signals, the request to enter, will give immediate notice to the military commander, notifying him of such information as the officer in charge of the station may deem useful, such as the name of the vessel, nationality, distance, bearing, etc.

If the military commander does not consider it convenient for authorization of entry to be given, he will cause the signal "U S X" to be made: "Sorry I am unable to comply with request."

The above reply may also be sent by radio if the request has been made in a similar way.

If consent is given a pilot will be sent. An official will also be sent in the case of neutral naval vessel or suspected vessels, such official being specially charged with the duties of recognizing the vessel by inspection and by boarding her. In such cases the inspecting officer is given authority to give or refuse leave to enter, according to the results of his visit. If the foregoing visit can not be made on account of the state of the sea, right of entry will be refused to neutral naval vessels or to foreign or Italian merchant vessels, unless they are in obvious danger. Under the authorization of the military commander a special system of signals will be drawn up, whereby the inspecting officer or the pilot may send through the semaphore station such information as may be useful or urgent. One of these signals is that the vessel has been subjected to a visit, and another that the pilot has gone aboard, but the signal indicating that a vessel has received permission to enter and proceed to her anchorage, which signal varies from day to day, will be hoisted without fail in an elevated position from which it is easily visible to semaphore stations and defense vessels.

6. By night all entry into maritime ports is absolutely forbidden. Permission is only granted to Italian naval vessels and to vessels of an allied power under the following circumstances:

- (a) Pursuit.
- (b) Grave damage to the hull or vital parts.
- (c) Stress of weather.

7. During the hours of night, the movements of all boats of foreign naval vessels, or of Italian or foreign merchant vessels which happen to be within a maritime port in a state of war, is absolutely forbidden, and they are not to communicate with the shore without previous permission from the military commander. In cases of urgency, when a vessel is under the necessity of communicating with the shore without having the necessary permission from the military commander, the means to do so may be provided on the conventional signal of requesting permission to do so being made.

Any other form of signaling is prohibited.

The aforementioned vessels may communicate with the shore during the hours of daylight by means of their boats, but these must follow the most direct track from their vessels to such landing place as they may have been instructed to use in such cases.

8. In the event of vessels contravening the foregoing regulations, the requisite signals from the semaphore stations will be hoisted and a blank shot will be fired from one of the batteries charged with such duties. In any case where such warning may prove ineffective, five minutes after the blank charge a ball shot will be fired about half a cable ahead of the vessel's bows. If, after this latter measure, the vessel still shows reluctance to obey the regulations, she will be fired upon and all means taken to ensure her obedience. In urgent cases the firing of a blank shot may be omitted.

9. For the purposes of the examination service the change of hours of night into hours of day, and vice versa, is fixed in all places at sunrise and sunset.

10. The following is a list of fortified ports included in this volume, and of such other places as are not to be approached without permission when in a state of war, as well as a list of the coastal limits of the areas of water comprised within them, anchorages, and the semaphore stations to which the request for permission to approach must be made.

Locality.	Coastal limits.	Anchorage.	Semaphore stations with which vessels must communicate.
Maddalena.....	From Cala di Volpe to Falcone Point....	{ Estuario della Maddalena.	{ Guardia Vecchia.
	{ From the mouth of the Italia to the mouth of the Mela (Sicily).	{ Messina.....	{ Cape Ferro.
Messina.....	{ From the mouth of the Vallone della Covaja to the mouth of the Fiume Vallandri (Calabria).	{ Milazzo.....	{ Fort Spuria.
	{ From the mouth of Torrente Corallo (at Spotorno to the mouth of Torrente Sansobbia.	{ Reggio.....	{ Cape d'Armi.
Vado.....		{ Villa San Giovanni..	
		{ Spotorno.....	{ Capo di Noli.
		{ Vado.....	
		{ Savona.....	
Spezia.....	{ From the mouth of Torrente Delva to the mouth of Fiume Frigido.	{ Levante, Monterosso	
		{ Porto Venere.....	{ Isola Palmaria.
		{ Spezia, Lerici.....	
		{ Bocche di Magra.....	
		{ Marina di Carrara.....	
		{ Talamone.....	
Monte Argentario.	{ From the mouth of Fiume Ombrone to the mouth of the Chiarone.	{ Porto Santo Stefano.	{ Torre di Cala Grande (Ronconali).
Gaeta.....	{ From Torre Capoverto to Torre Giano.	{ Porto Ercole.....	
		{ Gaeta.....	{ Torre Orlando.
		{ Formia.....	

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